

**Energy Savings Opportunity Survey  
Energy Engineering Analysis Program (EEAP)  
Fort Campbell, Kentucky**

***Final Report - Phase II***

***Volume 1  
Sections 1-3***

CONTRACT # DACA27-93-C-0096  
SYSTEMS/CORP PROJECT # 93006.01  
NOVEMBER 24, 1993

19971016 186

**SYSTEMS<sub>corp</sub>**

SYSTEMS ENGINEERING AND MANAGEMENT CORPORATION



US Army Corps  
of Engineers

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## 1 EXECUTIVE SUMMARY

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### 1.1 SYNOPSIS

Systems Corp surveyed and completed energy analyses for 112 buildings, two generators, four chillers, and roadway lighting. The energy conservation opportunities (ECOs) evaluated were lighting efficiency improvements, peak-shaving generators, chiller replacement, variable speed circulation pumps, EMCS expansion, and Commissary lighting. Cost estimates were prepared using M-CACES. Life cycle cost analyses were performed using the Life Cycle Cost in Design (LCCID) computer program. Project development brochures (PDBs) and DD1391 forms were prepared for Energy Conservation Investment Program (ECIP) projects. The projects that were developed represent \$187,203 in annual savings with favorable simple paybacks and savings to investment ratios (SIRs).

### 1.2 INTRODUCTION

Systems Engineering and Management Corporation (Systems Corp) was contracted by the Louisville District of the United States Army Corps of Engineers in June 1993 to perform an energy savings opportunity survey (ESOS) for 112 buildings at Fort Campbell, Kentucky. In addition, the project includes an exterior lighting survey of five locations around the facility, a comprehensive survey of two generators at the Water Treatment Plant and Boiling Springs Pump House, and four chillers serving four buildings.

#### 1.2.1 Scope of Work

1. Evaluate selected energy conservation opportunities (ECOs) to determine their energy savings potential and economic feasibility.
2. Conduct a limited site survey of selected buildings or areas to insure that any methods of energy conservation which are practical and have not been evaluated in any previous energy study have been considered and the results documented.
3. Survey generators to determine required equipment for use for peak-shaving.

## 1 EXECUTIVE SUMMARY

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4. Determine efficiency of existing chillers. Determine the replacement option with the highest SIR.
5. Provide complete programming or implementation documentation for all recommended ECOs.
6. Prepare a comprehensive report to document the work performed, the results, and the recommendations.

### 1.2.2 Organization of the Final Report

The submitted material for this report consists of the following:

Energy Savings Opportunity Survey  
Energy Engineering Analysis Program (EEAP)  
Fort Campbell, Kentucky

Volume 1: Sections 1 - 3  
Volume 2: Sections 3 (cont.) - 4  
Volume 3: Sections 4 (cont.) - 14

## 1.3 PRESENT AND HISTORICAL ENERGY CONSUMPTION

The baseline energy consumption and energy conservation opportunity energy consumption were determined using spreadsheets and manual calculations to model system energy consumption. These have been included in *Section 2* of this report.

## 1 EXECUTIVE SUMMARY

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### 1.3.1 Natural Gas Costs

The natural gas consumption and cost for the 12 months (July 1992-June 1993) at Fort Campbell are shown in *Table 1.3.1, Fort Campbell Natural Gas*. *Figure 1.3.1* is a bar graph of the monthly consumption and costs. The natural gas cost used for evaluating the ECOs is as follows:

$$\begin{aligned}\text{COST/MCF} &= \$3.41/\text{MCF} \\ \text{COST/MBTU} &= \$4.00/\text{MBTU}\end{aligned}$$

### 1.3.2 Electric Costs

The electric energy consumption, demand, and costs for the past 12 months (July 1992-June 1993) are shown in *Table 1.3.2 Fort Campbell Electric*. *Figure 1.3.2* is a bar graph of the monthly consumption and cost. The electric cost used to calculate the electric cost savings for the project is as follows:

$$\begin{aligned}\text{COST/KWH} &= \$0.02114/\text{KWH (No Demand)} \\ \text{COST/MBTU} &= \$6.19/\text{MBTU (No Demand)} \\ \text{COST/KW} &= \$11.78/\text{KW (Monthly Demand)}\end{aligned}$$

### 1.3.3 Fuel Oil Costs

The fuel oil consumption and costs for FY92 are shown in *Table 1.3.3.1 Fort Campbell Fuel Oil #2*. The fuel oil costs used to calculate savings for this project is as follows:

$$\text{COST/MBTU} = \$4.98/\text{MBTU}$$

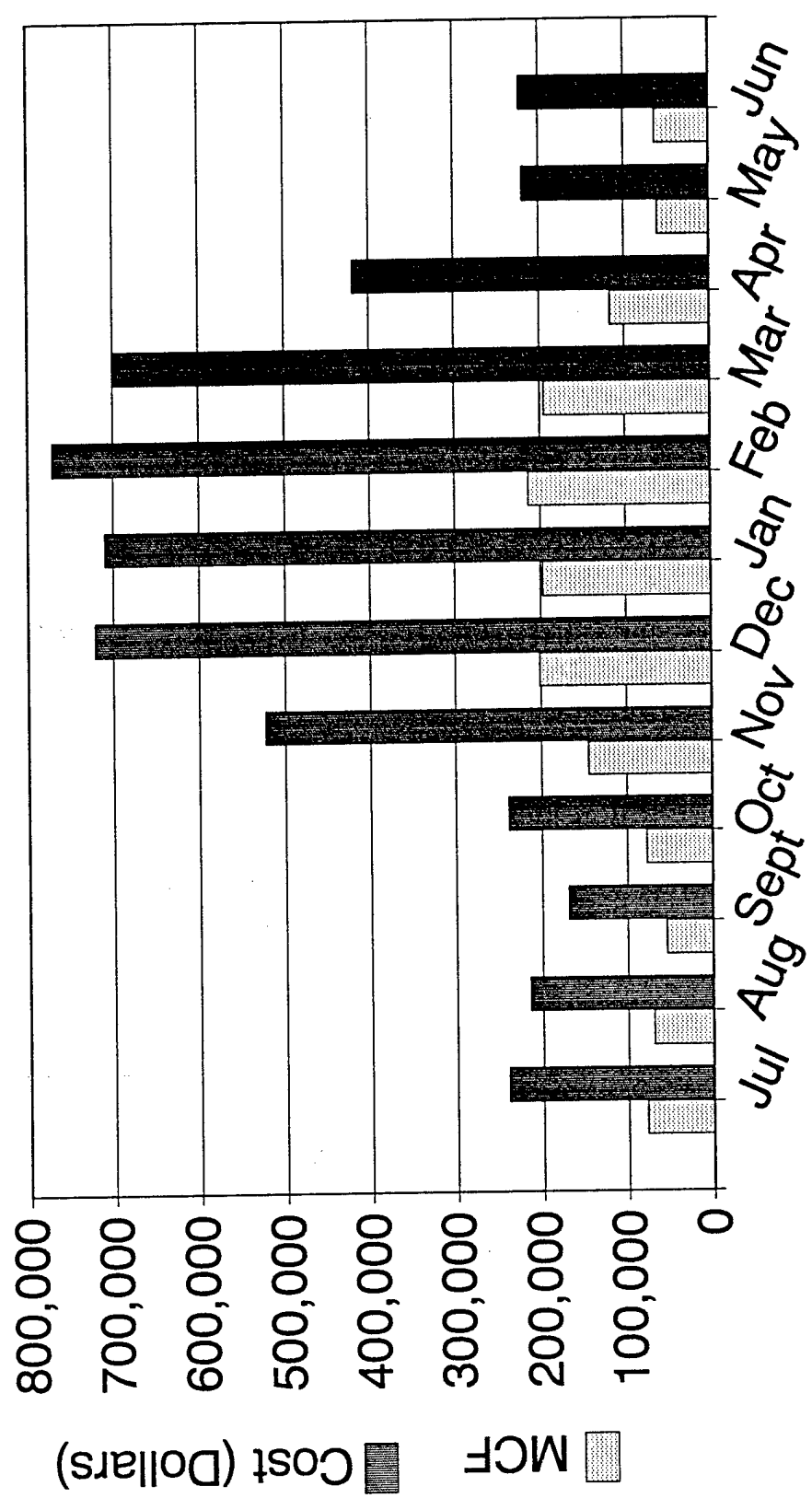
# FORT CAMPBELL NATURAL GAS

July 92 - June 93

MONTH	MCF	COST	COST/MCF
Jul 92	77,701	\$239,700	3.08
Aug	69,605	214,724	3.08
Sept	54,771	168,963	3.08
Oct	77,298	238,456	3.08
Nov	145,408	522,621	3.59
Dec	201,521	722,174	3.58
Jan 93	196,833	710,486	3.61
Feb	213,900	771,339	3.61
Mar	195,479	699,147	3.58
Apr	116,968	419,168	3.58
May	60,884	219,255	3.60
Jun	64,113	222,479	3.47
<b>TOTAL</b>	<b>1,474,481</b>	<b>\$5,148,485</b>	<b>3.49</b>
<b>Min</b>	<b>54,771</b>	<b>168,963</b>	<b>3.08</b>
<b>Max</b>	<b>213,900</b>	<b>771,339</b>	<b>3.61</b>
<b>Avg</b>	<b>122,873</b>	<b>429,040</b>	<b>3.41</b>

# FORT CAMPBELL ESOS

Natural Gas July 92 - June 93



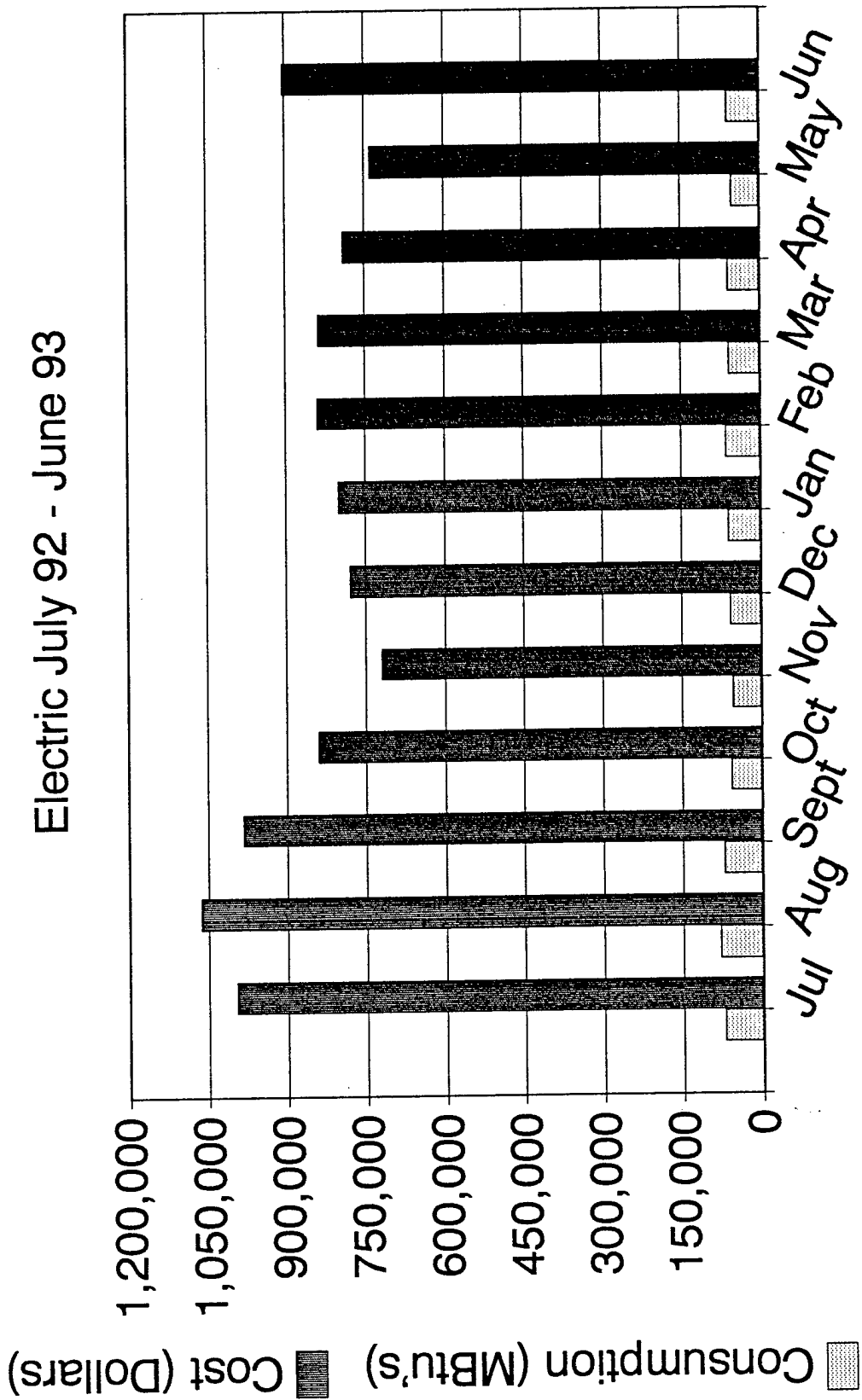
# FORT CAMPBELL ELECTRIC

July 92 - June 93

MONTH	DEMAND KW	DEMAND COST	CONSUMPTION KWH	CONSUMPTION COST	COST DEM & CONS	COST/KWH
Jul 92	45,171	\$532,114	21,096,600	\$464,810	\$996,924	.047
Aug	45,927	541,020	23,818,200	523,607	1,064,627	.045
Sept	43,697	514,751	21,319,200	469,265	984,016	.046
Oct	39,425	464,427	17,047,800	376,277	840,704	.049
Nov	31,072	366,028	16,077,600	353,458	719,486	.045
Dec	34,020	400,756	17,287,200	380,190	780,946	.045
Jan 93	33,907	399,424	18,320,400	402,420	801,844	.044
Feb	35,381	416,788	19,307,400	424,019	840,807	.044
Mar	38,140	449,289	17,644,200	388,828	838,117	.048
Apr	33,944	399,860	17,808,000	391,392	791,252	.044
May	34,663	408,330	15,691,200	331,712	740,042	.047
Jun	43,697	514,751	18,429,600	389,601	904,352	.049
<b>TOTAL</b>	<b>459,044</b>	<b>\$5,407,588</b>	<b>223,847,400</b>	<b>\$4,895,579</b>	<b>\$10,303,117</b>	<b>.046</b>
<b>Min</b>	<b>31,072</b>	<b>366,028</b>	<b>15,691,200</b>	<b>331,712</b>	<b>719,486</b>	<b>.044</b>
<b>Max</b>	<b>45,927</b>	<b>541,020</b>	<b>23,818,200</b>	<b>523,607</b>	<b>1,064,627</b>	<b>.049</b>
<b>Avg</b>	<b>38,254</b>	<b>450,628</b>	<b>18,653,950</b>	<b>407,965</b>	<b>858,593</b>	<b>.046</b>

# FORT CAMPBELL ESOS

Electric July 92 - June 93





# FORT CAMPBELL FUEL OIL #2

## FY92

MONTH	BARRELS	MBtu
Oct 91	379	2208
Nov	646	3763
Dec	1041	6064
Jan 92	1820	10,601
Feb	1152	6710
Mar	913	5318
Apr	478	2784
May	0	0
Jun	0	0
Jul	0	0
Aug	286	1666
Sep	0	0
<b>TOTAL</b>	<b>6715</b>	<b>39,114</b>
<b>Total Cost \$195,000</b>		<b>Avg Cost/MBtu \$4.98/MBtu</b>

## 1 EXECUTIVE SUMMARY

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### 1.4 ENERGY CONSERVATION OPPORTUNITIES INVESTIGATED

Systems Corp analyzed six energy conservation opportunities (ECOs) at Fort Campbell, Kentucky. The analysis was performed utilizing energy models developed by Systems Corp and data collected during the field survey of the facilities at Fort Campbell. Each ECO was evaluated to determine the potential energy savings, dollar savings, implementation costs, simple payback, life cycle cost, and savings to investment ratio (SIR). The six ECOs that were evaluated are as follows:

- |          |  |
|----------|--|
| ECO - 6  | Improve Lighting Efficiency                    |
| ECO - 7  | Peak-shaving Generators                        |
| ECO - 8  | Replace Chillers with High Efficiency Chillers |
| ECO - 9  | Variable Speed Circulation Pumps               |
| ECO - 10 | EMCS Expansion                                 |
| ECO - 11 | Improve Commissary Lighting Efficiency         |

Systems Corp's energy analysis models were used to determine the savings achieved for implementing each ECO in the facilities that were evaluated. The U.S Army Corp of Engineers M-CACES software was used to estimate the implementation cost of each ECO in each facility evaluated. The U.S Army Corp of Engineers Life Cycle Cost in Design, Version 1.0, Level 72, software was used to perform life cycle cost analyses and determine the SIR of each ECO for each facility evaluated.

#### 1.4.1 ECOs Recommended

Systems Corp recommended that the following ECOs be implemented due to favorable simple pay backs and savings investment ratios (SIRs).

- |         |                                  |
|---------|----------------------------------|
| ECO - 6 | Improve Lighting Efficiency      |
| ECO - 7 | Peak-shaving Generators          |
| ECO - 9 | Variable Speed Circulation Pumps |

## 1 EXECUTIVE SUMMARY

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ECO - 10 EMCS Expansion

ECO - 11 Improve Commissary Lighting Efficiency

### 1.4.2 ECOs Rejected

ECO-8, Replace Chiller with High Efficiency Chillers, was rejected due to the fact that the potential energy savings was found to be small for each building that was evaluated. The implementation costs for each building evaluated represented a large investment, and when compared to the savings resulted in simple paybacks in excess of twenty years. Replacing the chillers did not yield an acceptable simple payback in any of the four buildings evaluated.

### 1.4.3 ECIP Projects Developed

Systems Corp developed two ECIP projects. The projects include the improvement of lighting efficiency in 36 buildings and five family housing areas, and a combination of peak-shaving generators in two facilities, variable speed circulation pumps in two Korean war era barracks, and EMCS expansion in 15 facilities. The following table summarizes the savings and investment for each project.

## 1 EXECUTIVE SUMMARY

**TABLE 1.4.3**  
**ECIP PROJECT SUMMARY**

		1st Yr Savings	Investment	SIR	SPB (yrs)
ECIP-1	Lighting	\$44,078	\$342,581	7.77	1.44
ECIP-2	Gen/EMCS/VSD	\$143,125	\$558,366	3.33	3.90
	TOTAL	\$187,203	\$900,947	5.02*	2.96*

\* These numbers are weighted averages to show representative values for a total life cycle cost analysis.

### 1.4.4 Non-ECIP Projects Developed

Systems Corp developed 2 projects that did not qualify for ECIP funding due to not meeting the \$300,000 investment criteria. The 2 projects are improved lighting efficiency at the Commissary and improved lighting efficiency in non-appropriated funded facilities.

**TABLE 1.4.4**  
**NON-ECIP PROJECT SUMMARY**

	1st Yr Savings	Investment	SIR	SPB
COMMISSARY LIGHTING	\$39,904	\$130,696	3.48	3.28
NAF LIGHTING	1,218	7,422	1.84	6.09
TOTAL	\$41,122	\$138,118	3.39*	3.43*

\* These numbers are weighted averages to show representative values for a total life cycle cost analysis.

## 2.1 FIELD SURVEY

The field survey as performed by *Systems Corp* was designed to provide the necessary data required to complete the project. It was also designed to provide residual benefits to the installation by providing an organized and readily available source of information which can be used in future years. The information was transmitted in the form of field notes made on standardized survey forms. The field survey forms were submitted with the interim report.

The survey forms were designed to allow notations of all data which could be utilized (not necessarily required) to calculate the energy savings gained by implementing a specific energy conservation opportunity. These forms contain data obtained from as-built drawings and confirmed in the field as well as data obtained only in the field.

### 2.1.1 Buildings

Thorough preparation for the building survey was required to assure that the data required to perform the technical analysis is obtained. The building surveys were performed in a manner which assured the best results. A simple listing of each step of the process best describes our approach to the surveys.

1. The list of ECOs included in the work scope were reviewed in detail.
2. Each ECO was given an identification number which is used consistently throughout this project.
3. An expanded description of each ECO was formulated to outline the possible methods for implementation of the ECO.
4. Survey forms were developed for each ECO to provide space to enter and data which might possibly be used in performing the engineering and economic analysis of the ECO.
5. A list of the types of as-built drawings required for the buildings was prepared based on the information required on the ECO survey forms.

6. A *Systems Corp* representative assisted during the survey in gathering the necessary as-built drawings.
7. Due to the age of drawings, it was determined that most required information would need to be gathered during the survey at the buildings.
8. The building surveys were then performed, confirming or revising data obtained from the drawings. Additional data was obtained as required.
9. The Exit Interview was scheduled.

*Table 2.1.1.1* is a list of the buildings surveyed sorted by building type.

**TABLE 2.1.1.1**  
**BUILDINGS SURVEYED**

(Page 1 of 4)

	BUILDING NUMBER	BUILDING SIZE ( FT <sup>2</sup> )
BUILDING TYPE: BOWLING ALLEY	5380	26460
	TOTAL AREA:	26460 FT <sup>2</sup>
BUILDING TYPE: POST EXCHANGE	2840	NOT AVAILABLE
	TOTAL AREA:	N.A. FT <sup>2</sup>
BUILDING TYPE: ADMINISTRATIVE	6734	3610
	6735	2746
	6736	2581
	6737	2581
	6738	2581
	6773	2581
	6784	2581
	6789	3610
	6790	3610
	6901	9303
	6904	2581
	6905	2581
	6906	2581
	6907	2581
	6908	2581
	6913	2581
	6914	3610
	6916	2581
	6924	2581
	6924a	3688
	6925	3610
	6926	2581
	6932	2581
	6934	3610
	6935	2581
	TOTAL AREA:	78693 FT <sup>2</sup>

**TABLE 2.1.1.1  
BUILDINGS SURVEYED**

(Page 2 of 4)

	BUILDING NUMBER	BUILDING SIZE ( FT <sup>2</sup> )
BUILDING TYPE:	3934	11200
CHAPEL	6933	3610
	TOTAL AREA:	14810 FT <sup>2</sup>
BUILDING TYPE:	6903	2686
TROOP MEDICAL CLINIC	6915	3610
	TOTAL AREA:	6296 FT <sup>2</sup>
BUILDING TYPE:	80	28580
CHILD CARE	3069	NOT AVAILABLE
	3071	NOT AVAILABLE
	TOTAL AREA:	28580 FT <sup>2</sup>
BUILDING TYPE:	6628	63697
WAREHOUSE	7855	10815
	7856	9607
	TOTAL AREA:	84119 FT <sup>2</sup>
BUILDING TYPE:	2702	74021
COMMISSARY		
	TOTAL AREA:	74021 FT <sup>2</sup>
BUILDING TYPE:	6921a	1470
CHILLER PLANT		
	TOTAL AREA:	1470 FT <sup>2</sup>



**TABLE 2.1.1.1**  
**BUILDINGS SURVEYED**

(Page 3 of 4)

	BUILDING NUMBER	BUILDING SIZE (FT <sup>2</sup> )
BUILDING TYPE: CLASSROOM & ADMINISTRATIVE	6740	4141
	6744	7200
	6991	3688
	6993	3688
	6995	3688
	6997	3567
	TOTAL AREA:	25972 FT <sup>2</sup>
BUILDING TYPE: HANGAR	6627	30235
	6636	63223
	7243	41117
	7262	69243
	7264	60000
	7268	60400
	7272	38968
	TOTAL AREA:	324218 FT <sup>2</sup>
BUILDING TYPE: TROOP SERVICES	6902	3867
	TOTAL AREA:	3867 FT <sup>2</sup>
BUILDING TYPE: VISITOR/PASS CENTER	5004	1687
	TOTAL AREA:	1687 FT <sup>2</sup>

**TABLE 2.1.1.1**  
**BUILDINGS SURVEYED**

(Page 4 of 4)

**BUILDING TYPE: BARRACKS**

BUILDING NUMBER	BUILDING SIZE (FT <sup>2</sup> )	BUILDING NUMBER	BUILDING SIZE (FT <sup>2</sup> )
3211	39722	6780	39722
3212	39722	6781	37904
3213	42627	6782	38131
3214	42627	6783	31737
3215	39809	6909	31758
3216	39809	6910	38089
3217	39722	6911	38280
3218	39722	6912	38310
6709	38145	6917	38480
6710	38406	6918	38646
6711	38329	6919	38711
6712	38285	6920	38649
6718	31869	6921	38512
6719	31779	6922	38691
6725	38241	6923	38465
6726	38160	6927	38118
6727	38312	6928	38120
6728	38285	6929	38281
6730	38138	6930	38196
6731	38208	6931	31713
6732	38442	6936	31735
6733	37977	6937	37900
6774	31953	6938	38039
6775	38137	6939	38137
6776	38152	6940	38127
6777	38249	6942	38098
6778	38180	6943	38049
6779	39722	6944	38063
		6945	31685
<b>TOTAL AREA: 2149075 FT<sup>2</sup></b>			

## 2 METHODS AND APPROACH

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### 2.1.2 Exterior Lighting

The exterior lighting survey was performed in much the same way as the building survey. The approach for the exterior lighting survey was to survey the specified locations on the post. A listing of the steps required to complete this task are as follows:

1. The ECO was reviewed in detail and given an identification number.
2. An expanded description of the ECO was formulated to outline the possible methods of implementation.
3. A survey form was developed.
4. Site maps were reviewed and survey locations were identified.
5. A preliminary site survey was performed to establish fixture distances, mounting height and area types.
6. Sketches of the locations and preliminary data were prepared for field notes.
7. Lamp wattage information was obtained from the electrical maintenance staff.
8. A daylight survey of each location was performed to identify fixture and lamp types, wattages and voltages.
9. A nighttime survey was performed to measure light levels at each of the surveyed locations.

*Table 2.1.2.1* is a listing of the areas surveyed for exterior lighting.

**TABLE 2.1.2.1**  
**EXTERIOR LIGHTING SURVEY LOCATIONS**

AREA NUMBER	AREA NAME
9991	STRYKER VILLAGE
9992	GARDNER HILLS
9993	COLE PARK
9994	DRENNAN PARK
9995	WERNER PARK

### 2.1.3 Generators

The survey for the generators consisted of Building 1746, the Water Treatment Plant, and the Boiling Springs Pump Station. The generators would be used to shave demand at each location, not post wide. During the survey, the following information was collected:

1. Manufacturer, model, and serial numbers
2. Estimated KW demand at each location
3. Required hours of operation
4. Fuel storage capacity.

### 2.1.4 Chillers

The survey of the chillers consisted of four electric chillers serving the administrative areas. During the survey the following information was gathered by on-site visual inspections, review of maintenance records, review of design documents, review of manufacturers submittals and measurements of operating characteristics.

1. Manufacturer, model, and serial numbers
2. Chilled water pump data

The data gathered was used to determine the current operating characteristics of the existing chillers including the coefficients of performance. The data collected was more than adequate to evaluate the energy conservation opportunities.

*Table 2.1.4.1* lists the buildings surveyed for chiller replacement.

**TABLE 2.1.4.1**  
**CHILLERS SURVEYED**

BUILDING NUMBER	BUILDING SIZE	BUILDING DESCRIPTION
38	16038	POST LIBRARY
93	17492	MOVIE THEATRE
95	21864	COMMUNIC & ADMINI
98	102645	POST EXCHANGE

## 2 METHODS AND APPROACH

---

### 2.2 Calculations

Energy calculations were performed using both manual and computerized techniques. Due to the large volume of calculations to be performed using both methods, standardized procedures were developed for both computer models and the hand calculated models. This assured consistent results and uniformity of quality in all of the calculations performed.

#### 2.2.1 Baseline Energy Consumption

The following sections will describe the method for calculating the baseline energy consumption for each of the six ECOs.

##### 2.2.1.1 Baseline Energy Consumption: ECO-6

The baseline energy consumption for the interior and exterior lighting was calculated using a LOTUS123 spreadsheet. These spreadsheets modeled the consumption of the existing lighting systems by utilizing the following:

1. Existing fixture type (i.e. fluorescent, mercury vapor, etc.)
2. Lamp wattage
3. Ballast wattage
4. Hours of use.

The above information was obtained during the field survey. *Table 2.2.1.1.1* lists the baseline consumption for the ECO.

##### 2.2.1.2 Baseline Energy Consumption: ECO-7

The baseline energy consumption for the generators was calculated using a LOTUS123 spreadsheet. The energy consumption was modeled using manufacturer's data (efficiency), and the hours of operation noted in the field. The generators are currently used as emergency backup so the primary hours of operation are the monthly test start-up. *Table 2.2.1.2.1* lists the baseline consumption for the generators.

**TABLE 2.2.1.1.1**  
**BASELINE ENERGY CONSUMPTION**

ECO - 6

(Page 1 of 2)

BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
6734	34.60
6735	37.45
6736	41.90
6737	61.70
6738	47.28
6740	76.99
6744	167.10
6773	38.17
6784	52.08
6789	47.43
6790	35.58
6901	120.62
6902	68.70
6903	41.21
6904	43.82
6905	46.83
6906	38.84
6907	34.82
6908	34.78
6913	36.25
6914	51.78
6915	28.27
6916	40.87
6924	41.98
6924.1	59.27
6925	57.17
6926	45.38
6932	39.07
6933	23.88
6934	51.45
6935	61.77
6991	42.53
6993	33.72
6995	58.76
6997	134.10
7855	143.98
7856	192.06



**TABLE 2.2.1.1.1**  
**BASELINE ENERGY CONSUMPTION**

ECO - 6  
(Page 2 of 2)

AREA NUMBER	AREA DESCRIPTION	BASELINE ENERGY CONSUMPTION (MBTU)
9991	STRYKER VILLAGE	8.06
9992	GARDENER HILLS	112.77
9993	COLE PARK	177.21
9994	DRENNAN PARK	128.88
9995	WERNER PARK	136.94

**TABLE 2.2.1.2.1  
BASELINE ENERGY CONSUMPTION  
AND GENERATORS**

	<b>BUILDING NUMBER</b>	<b>BASELINE ENERGY CONSUMPTION (MBTU)</b>
<b>GENERATORS*</b>	<b>9996</b>	<b>2232</b>
	<b>9997</b>	<b>1339</b>

\* 9996 → Water Treatment Plant

9997 → Boiling Springs Pump House

## 2 METHODS AND APPROACH

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### 2.2.1.3 Baseline Energy Consumption: ECO-8

The baseline energy consumption for the chillers was calculated using a LOTUS123 spreadsheet. This spreadsheet modeled the energy consumption of the existing chillers by utilizing manufacturer's data (COP of the unit), field measurements, and weather bin data. *Table 2.2.1.3.1* lists the baseline consumption for the chillers.

### 2.2.1.4 Baseline Energy Consumption: ECO-9

The baseline energy consumption for the heating/cooling circulating pumps was calculated using a LOTUS123 spreadsheet. This spreadsheet modeled the energy consumption of the pumps by using the motor horsepower, weather bin data, and manufacturer's data (motor efficiency). *Table 2.2.1.4.1* lists the baseline energy consumption for the pumps.

### 2.2.1.5 Baseline Energy Consumption: ECO-10

The baseline energy consumption for the equipment to be connected to the EMCS system was calculated using manual techniques. Information used includes weather bin data, degree days, and field data. Field data includes motor horsepower; boiler, chiller, and air handling unit information; and time clock utilization. *Table 2.2.1.5.1* lists the baseline consumption for each facility in this ECO.

### 2.2.1.6 Baseline Energy Consumption: ECO-11

The baseline energy consumption for the lighting at the Commissary was calculated using a LOTUS123 spreadsheet. The spreadsheet modeled the consumption of the existing lighting system by utilizing the following:

1. Existing fixture type (fluorescent and incandescent)
2. Lamp wattage
3. Ballast wattage
4. Hours of use.

The above information was obtained during the field survey. The baseline consumption is listed in *Table 2.2.1.6.1*.

TABLE 2.2.1.3.1 CHILLER BASELINE ENERGY CONSUMPTION	
BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
38	436
93	575
95	370
98	616

**TABLE 2.2.1.4.1**  
**BASELINE ENERGY CONSUMPTION**  
**ECO - 9**

BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
3211	111
3212	111
3213	111
3214	111
3215	111
3216	111
3217	111
3218	111
6709	167
6710	167
6711	167
6712	167
6718	167
6719	167
6725	167
6726	167
6727	167
6728	167
6730	167
6731	167
6732	167
6733	167
6774	111
6775	111
6776	111
6777	111
6778	111
6779	167

BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
6780	167
6781	167
6782	167
6783	167
6909	167
6910	167
6911	167
6912	167
6917	167
6918	167
6919	167
6920	167
6921	167
6922	167
6923	167
6927	167
6928	167
6929	167
6930	167
6931	167
6936	167
6937	167
6938	167
6939	167
6940	167
6942	334
6943	223
6944	167
6945	167

<b>TABLE 2.2.1.5.1</b> <b>BASELINE ENERGY CONSUMPTION</b> <b>ECO - 10</b>	
BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
80	2459
2702	3428
2840	4561
3069	1757
3071	1757
3934	1120
5004	
5380	2712
6627	2969
6628	
6636	2879
6921.1	15705
7243	7430
7262	6798
7264	7750
7268	6570
7272	4782

<b>TABLE 2.2.1.6.1</b> <b>BASELINE ENERGY CONSUMPTION</b> <b>ECO - 9</b>	
BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MBTU)
2702	4140

## 2 METHODS AND APPROACH

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### 2.3 ENERGY CONSERVATION OPPORTUNITIES

Systems Corp analyzed six distinct energy conservation opportunities (ECOs) at Fort Campbell, Kentucky. The analysis was performed utilizing energy models developed by Systems Corp and data collected during the field survey of the facilities at Fort Campbell. Each ECO was evaluated to determine the potential energy savings, dollar savings, implementation costs, simple payback, life cycle cost and savings to investment ratio (SIR). The five ECOs that were evaluated are as follows:

- ECO - 6            Improve lighting efficiency
- ECO - 7            Peak-Shaving generators
- ECO - 8            Replace chillers with high efficiency chillers
- ECO - 9            Variable speed circulation pumps
- ECO - 10    EMCS expansion
- ECO - 11    Improve commissary lighting efficiency

Systems Corp's energy analysis models were used to determine the savings achieved for implementing each ECO in the facilities that were evaluated. The U.S Army Corp of Engineers M-CACES software was utilized to estimate the implementation cost of each ECO in each facility evaluated. The U.S Army Corp of Engineers Life Cycle Cost in Design, Version 1.0, Level 72, software was used to perform life cycle cost analyses and determine the SIR of each ECO for each facility evaluated.

#### 2.3.1 ECO - 6: Improve Lighting Efficiency

The ECO evaluation consisted of determining appropriate lighting replacements to improve lighting system efficiency while achieving recommended illumination levels. The ECO includes comprehensive lighting replacements.

TABLE 2.3.1.1	
LIGHTING SYSTEM REPLACEMENTS	
ECO 6	
EXISTING LIGHTING	REPLACEMENT LIGHTING
T-12 Fluorescent Fixture	T-8 Fluorescent Fixture with reflector
T-12 Lamp	T-8 Lamp
Magnetic Ballast	Electronic Ballast
Incandescent Fixture	Compact Fluorescent Fixture
Incandescent Lamp	Compact Fluorescent Lamp and Ballast
Incandescent Exit Sign	LED (Light Emitting Diode) Exit Sign
Mercury Vapor Fixture	High Pressure Sodium Fixture
Mercury Vapor Ballast	Electronic Ballast
Mercury Vapor Lamp	High Pressure Sodium Lamp

The lighting replacements are for administrative, warehouse, maintenance, and retail facilities and roadway lighting.

### 2.3.2 ECO - 7: Peak-Shaving Generators

Currently the diesel fired generators at the water treatment plant and the Boiling Springs Pump Station are only run during periods of power interruption or to test the generators. During all other periods, the treatment plant and pump station operate on power purchased from the utility company. The proposed construction will consist of new controls linking the generators to the Post Energy Management Control System. The new controls will allow for the remote operation of the generators and include start/stop capability. The generators will be used to meet the electric load of the respective plants during periods of the Post's peak electrical demand.



**2.3.3 ECO - 8: Replace Chillers with High Efficiency Chillers**

This ECO evaluated the replacement of existing electric reciprocating chillers at four administrative facilities. Electric replacement options were evaluated. The use of natural gas engine units were not evaluated due to the high initial cost per ton for engine chillers less than 100 tons in size. This ECO did not have a qualifying payback in any of the four facilities evaluated. The existing chillers were found to be relatively new (approximately five years old). The energy savings was very low even when a higher efficiency unit was used. Paybacks in excess of twenty years were the result for each of the four facilities. Systems Corp suggests, for future studies, that older units be considered for replacement.

**2.3.4 ECO - 9: Variable Speed Circulation Pumps**

The existing dual temperature water pumps in buildings 6942 and 6943, respectively fifteen and ten horsepower, operate at a constant speed for 8760 hours per year. The addition of variable speed drives and two-way control valves will allow the speed of the pumps to be varied, thus varying the system water flow. The two-way control valves will be retrofitted to the fan coil units that are served by the pumps. The throttling action of the two-way control valves at non-peak loads will allow the system to reduce flow without reducing pressure. The water flow will be varied to match the system heating or cooling load. Water in excess of that required to meet the heating or cooling demand will not be pumped.

**2.3.5 ECO - 10: EMCS Expansion**

The Energy Management Control System (EMCS) extension and expansion will include adding fifteen buildings to the current Post EMCS. The EMCS will provide for remote monitoring, night setback, and start/stop capability for each piece of equipment that is connected to the system. The project extends and expands the EMCS to fifteen buildings. The buildings include Building 80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6912A, 7243, 7262, 7264, 7268 and 7272.

## 2 METHODS AND APPROACH

### 2.3.6 ECO - 11: Improve Commissary Lighting Efficiency

The ECO evaluation consisted of determining appropriate lighting replacements to improve lighting system efficiency at the Commissary while achieving recommended illumination levels. The ECO includes comprehensive fluorescent lighting replacements.

TABLE 2.3.6.1	
LIGHTING SYSTEM REPLACEMENTS	
ECO 11	
EXISTING LIGHTING	REPLACEMENT LIGHTING
T-12 Fluorescent Fixture	T-8 Fluorescent Fixture with reflector
T-12 Lamp	T-8 Lamp
Magnetic Ballast	Electronic Ballast

The lighting replacements at the Commissary were found to have a good payback due to the extended hours of use.

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### 3 PROGRAMMING DOCUMENT - ECIP PROJECT 1

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### 3 PROGRAMMING DOCUMENT - ECIP PROJECT 1

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### 3 PROGRAMMING DOCUMENT - ECIP PROJECT 1

The ECO evaluation consisted of determining appropriate lighting replacements to improve lighting system efficiency while achieving recommended illumination levels. The ECO includes comprehensive lighting replacements.

<b>TABLE 3.1</b>	
<b>LIGHTING SYSTEM REPLACEMENTS</b>	
<b>ECO 6</b>	
<b>EXISTING LIGHTING</b>	<b>REPLACEMENT LIGHTING</b>
T-12 Fluorescent Fixture	T-8 Fluorescent Fixture with reflector
T-12 Lamp	T-8 Lamp
Magnetic Ballast	Electronic Ballast
Incandescent Fixture	Compact Fluorescent Fixture
Incandescent Lamp	Compact Fluorescent Lamp and Ballast
Incandescent Exit Sign	LED (Light Emitting Diode) Exit Sign
Mercury Vapor Fixture	High Pressure Sodium Fixture
Mercury Vapor Ballast	Electronic Ballast
Mercury Vapor Lamp	High Pressure Sodium Lamp

The lighting replacements are for administrative, warehouse, maintenance, and retail facilities and roadway lighting.

This section contains the programming documentation for ECIP Project 1, improvement of indoor/outdoor lighting efficiency. Included are the Project Development Brochures, DD1391 forms, life cycle cost analysis, cost estimates for each building, and energy calculations for each building. Catalog cut sheets are included as an appendix to the document (located at the end of this section) to represent the replacement products.

### 3 PROGRAMMING DOCUMENT - ECIP PROJECT 1

---

The life cycle analysis, Sections 3A and 3B, refers to non-energy savings or costs present. For this project, Section 3A, Annual Recurring, reflects maintenance savings available by replacing the existing lighting systems. The new fixtures, due to the use of reflectors, have fewer lamps which saves on material and labor replacement. Compact fluorescents are rated for 10,000 hours versus 750 hours for an incandescent lamp which saves labor for replacements. LED exit signs have similar savings.

Section 3B, Non-Recurring Savings/Costs, refers to the replacement of parts of the existing lighting system. Many fluorescent fixtures surveyed were approaching the end of their economic life. On the spreadsheets included for fluorescent fixture replacement for each building, the higher wattage fixture for each type was replaced in this section. Mercury vapor fixtures were also replaced in 3B due to the termination of their manufacturing in the year 2000.

# **facility**

INTERIOR/EXTERIOR LIGHTING REPLACEMENT

Fort Campbell, Kentucky

## **project coordinator for using service**

Arlin Wright

**functional requirements summary, PDB-1**

3-2



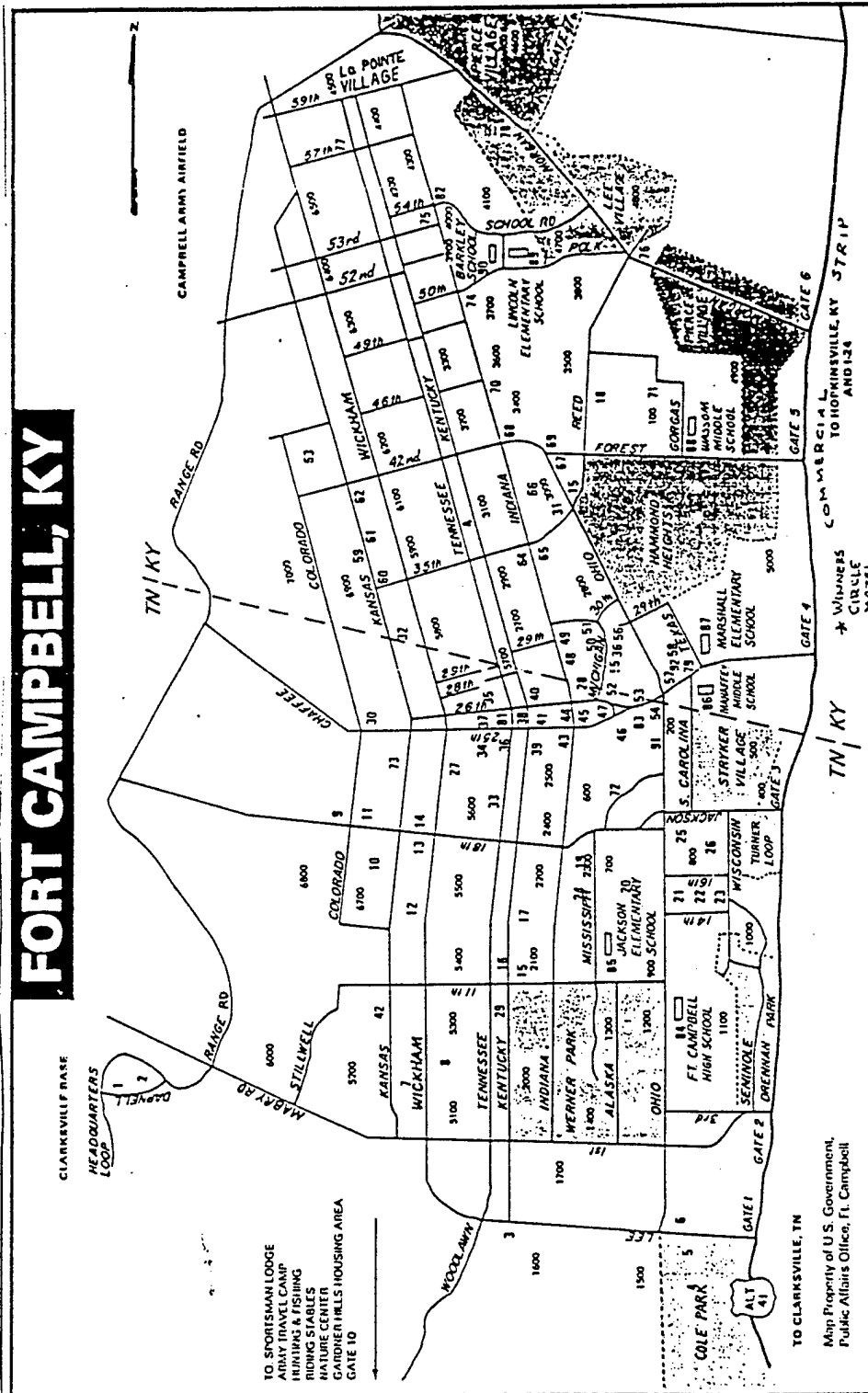
OBJECTIVE:

The objective of this project is to replace existing interior and exterior lighting with higher efficiency fixtures and lamps. The replacement of the existing lighting will reduce energy consumption and life cycle operating costs for the subject facilities in accordance with the Army Energy Resources Management Plan (ERMP) and Executive Order 12759.

functional requirements summary, PDB-1

3-3

# FORT CAMPBELL, KY



facilities requirements sketch, PDB- 1/2

3-4

APPENDIX C  
DOCUMENTATION CHECKLIST

## A. SPECIAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
A-1	Cost estimates for each primary and supporting facility	R	D		1
A-2	Telecommunications system coordination with USACC and authorization for exceptions	NR			
A-3	Coordination with state and local governmental requirements (blind vendors, medical facilities, construction and operating permits, clearinghouse coordination, etc.)	R	A		
A-4	Assignment of airspace	NR			
A-5	Economic analysis of alternatives	R	D		
A-6	Approval for new starts	NR			
A-7	International balance of payments (IBOP) coordination with U.S. European command and NATO—overseas cost estimates and comparables (include rate of exchange used in estimates)	NR			
A-8	Impact on historic places—on site survey by authorized archeologist and coordination with state historic preservation officer and advisory council on historic preservation	NR			
A-9	Exceptions to established criteria	NR			
A-10	Coordination with various staff agencies (Provost Marshall-physical security, etc.)	R			
A-11	Identification of related or support projects (so projects can be coordinated)	R			
A-12	Required completion date	R			
Other Special Considerations (List and number items)					
1. See Appendix A					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

**TO BE DETERMINED** — Information needed but not currently available. Enter code for information source.

**COMMENT ATTACHED** — Significant information summarized or explained and attached.

**DOCUMENT ATTACHED** — Significant information is in an existing document which is attached.

\* BY WHOM (Check and insert appropriate letter)

- A — DFAE
- B — Using Service
- C — Construction Service
- D — Designer
- E — Other (Check Comments Attached and explain)

# documentation checklist

3-6

## B. SITE DEVELOPMENT

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
B-1	Consultation with the District Office to determine and evaluate flood plain hazards	NR			
B-2	Preparation, submission, and/or approval of new	NR			
(A)	General Site Plan	NR			
(B)	Annotated General Site Plan	NR			
(C)	Sketch Site Plan	NR			
(D)	Facilities Requirements Sketch	R			
B-3	Preparation of	NR			
(A)	Site Survey	NR			
(B)	Subsoil information	NR			
B-4	Approval by Department of Defense Explosive Safety Board (DDESB) for Safety Site Plan	NR			
Other Site Development Considerations (List and number items)					
1. See Project Development Brochure, PDB-1/2					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

# documentation checklist

3-7

## C. ARCHITECTURAL & STRUCTURAL

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
C-1	Reconciliation with troop housing programs and requirements	NR			
C-2	Evaluation of existing facilities (including degree of utilization)	R	D		1
C-3	Approval for removal and relocation of existing useable facilities	NR			
C-4	Evaluation of off-post community facilities	NR			
C-5	Storage and maintenance facilities (including nuclear weapons)	NR			
C-6	Coordination hospitals, medical and dental facilities with Surgeon General	NR			
C-7	Coordination of aviation facilities with FAA	NR			
C-8	Coordination air traffic control and navigational aids with USACC	NR			
C-9	Tabulation of types and numbers of aircraft	NR			
C-10	Evaluation of laboratory, research and development, and technical maintenance facilities	NR			
C-11	Coordination chapels with Chief of Chaplains	NR			
C-12	Review food service facilities by USATSA	NR			
C-13	Automated data processing system or equipment approvals—cost analysis when ADP and/or communication centers not co-located with related facilities	NR			
C-14	Coordination postal facilities with U.S. Postal Service Regional Director	NR			
C-15	Laundry and dry cleaning facilities coordination with ASD(I&L)	NR			
C-16	Tenant facilities coordination with installation where sited	NR			
C-17	Facilities for or exposed to explosions, toxic chemicals, or ammunition—review by DDESB (See also Item B-4)	NR			
C-18	Analysis of deficiencies	R	D		1
C-19	Consideration of alternatives	R	D		2
C-20	Determination whether occupants will include physically handicapped or disabled persons	NR			
C-21	As-build drawings for alterations or additions	R	C		
C-22	Availability of Standard Design or site adaptable designs	NR			
Other Architectural & Structural (List and number items)					
1. See Supplemental Data Detailed Project Justification Paragraph D3.					
2. See Supplemental Data Detailed Project Justification Paragraph D4.					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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- A — DFAE
- B — Using Service
- C — Construction Service
- D — Designer
- E — Other (Check Comments Attached and explain)

# documentation checklist

3-8

## D. MECHANICAL, ELECTRICAL, & UTILITY SYSTEMS

### ITEM

- |     |  |
|-----|--|
| D-1 | Fuel considerations and cost comparison analysis       |
| D-2 | Energy requirements appraisal (ERA)                    |
| D-3 | Conformance with DOD Energy Reduction requirements     |
| D-4 | Evaluation of existing and/or proposed utility systems |

Other Mechanical and Utility Systems (List and number items)

1. See Special Requirements, Paragraph 3 (SRP-3)

Required or Not Required	To Be Determined	Comment Attached	Document Attached
R	D		
R	D		1
R	D		
R	D		

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\*BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

# documentation checklist

3-9

## E. ENVIRONMENTAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
E-1	Environmental impact assessment	R	D		1
E-2	EIA conclusions require Environmental Impact Statement	NR			
E-3	Determination of health, environmental or related hazards. Assistance to determine existence of any health, environmental or related hazard may be requested from Aberdeen Proving Ground, MD 21010, the Office of the Surgeon General, Attn: DASG-HCH (Army Environmental Hygiene Agency)	NR			
E-4	Air/water pollution permit, coordination with agencies and compliance with standards at Federal, state and local level	NR			
E-5	Corrective measures associated with Environmental Impact Statements or assessment—list separately and evaluate.	NR			
<p>Other environmental considerations (list and number items)</p> <p>1. See Supplemental Data Detailed Project Justification Paragraph D9.</p>					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\* BY WHOM** (Check and insert appropriate letter)

- A — DFAE
- B — Using Service
- C — Construction Service
- D — Designer
- E — Other (Check Comments Attached and explain)

# documentation checklist

3-10



APPENDIX D  
TECHNICAL DATA CHECKLIST

## A. SPECIAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
A-1	Factors of risk, restriction or unusual circumstance expected to increase costs beyond applicable area averages	NR			
A-2	Construction phasing requirements	R	D		
A-3	Functional support equipment (mechanical, electrical, structural, and security) to be built in	NR			
A-4	Equipment in place and justification	NR			
A-5	Other equipment and furniture (O&MA, OPA) and costs	NR			
A-6	Special studies and tests (hazards analyses, compatibility testing, new technology testing, etc.)	NR			
A-7	Type of construction (permanent, temporary, semi-permanent)	NR			
A-8	Government furnished equipment (quantities, procurement time, availability and special handling and storage requirements). Funds used for procurement.	NR			
	Other special considerations (list and number items)				

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\*BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

# technical data checklist

3-12

## B. SITE DEVELOPMENT

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
B-1 (A)	Construction restrictions or guidelines pertaining to site access and preferred construction routes	R	A		
(B)	Airfield clearance, explosive storage, working hours, safety, etc.	NR			
(C)	Facilities and/or functions or adjoining areas (structures, materials, impact)	R	A		
B-2	Real estate actions (acquisition, disposal, lease, right-of-way)	NR			
B-3 (A)	Demolition/relocation required (data) Special considerations due to explosives/radioactivity/chemical contamination/asbestos emissions/toxic gases	R	A	1	
(B)	Restrictions on disposal of demolished/relocated material including hazardous waste	NR			
B-4	Pavement types and requirements (including traffic surveys and MTMC coordination)	NR			
B-5 (A)	Landscape considerations Protection of existing vegetation	R	A		
(B)	Stockpile topsoil	NR			
Other Site Development (List and number items)					
1. There is a possibility that the existing lighting may contain PCB's in the ballasts.					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\*BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

# technical data checklist

3-13

## C. ARCHITECTURAL & STRUCTURAL

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
C-1	Vibration-producing equipment requiring isolation	R	D		
C-2	Seismic zone and other design load criteria (typhoon, hurricane, earthquake loads, high or low loss potential)	NR			
C-3	Protective shelter evaluation and resistant design criteria (conventional/nuclear blast and radiation, chemical/biological)	NR			
C-4	Unusual foundation requirements (pier, pile, caisson, deep foundations, mat, special treatment, permafrost areas, soil bearing)	NR			
C-5	Designation and strength of units to be accommodated	NR			
C-6	Requirements and data for special design projects	NR			
C-7	Unusual floor and roof loads (safes, equipment)	NR			
C-8	Security features (arms rooms, vaults, interior secure areas)	NR			
Other Architectural & Structural (List and number items)					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

**TO BE DETERMINED** — Information needed but not currently available. Enter code for information source.

**COMMENT ATTACHED** — Significant information summarized or explained and attached.

**DOCUMENT ATTACHED** — Significant information is in an existing document which is attached.

**\* BY WHOM** (Check and insert appropriate letter)

- A — DFAE
- B — Using Service
- C — Construction Service
- D — Designer
- E — Other (Check Comments Attached and explain)

# technical data checklist

3-14

## D. MECHANICAL, ELECTRICAL, & UTILITY SYSTEMS

ITEM		Required or Not Required	* To Be Determined	Comment Attached	Document Attached
D-1	Special mechanical requirements or considerations (elevator, crane, hoist, etc.)	NR			
D-2	Special peak usage periods and peak leveling techniques	NR			
D-3	Maintenance considerations (accessibility of equipment, compatibility with existing equipment)	R	D		
D-4	Plumbing—availability, general system type and characteristics (proposed and/or existing, incl. compressed air and gas)	R	D		
D-5	Heating—availability, general system type and characteristics (proposed and/or existing)	NR			
D-6	Ventilating, air condition/refrigeration—availability, general system type and characteristics (proposed and/or existing)	R	D		
D-7	Electrical—availability, general system type and characteristics incl. airfield lighting, communication, etc. (proposed and/or existing)	NR			
D-8	Water supply/waste treatment—availability, general system type and characteristics (proposed and/or existing)	NR			
D-9	Energy requirements/fuel conversion (sources, availability, loads, types of fuel, etc.)	R	D		
D-10	Solar energy evaluation	NR			
Other Mechanical & Utility Systems (List and number items)					

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\* BY WHOM** (Check and insert appropriate letter)

A — DFAE  
 B — Using Service  
 C — Construction Service  
 D — Designer  
 E — Other (Check Comments Attached and explain)

# technical data checklist

3-15

## E. ENVIRONMENTAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
E-1	Waste water treatment, air quality, and solid waste disposal criteria	NR			
	Other Environmental Considerations (List and number items)				

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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**\*BY WHOM** (Check and insert appropriate letter)

- A — DFAE
- B — Using Service
- C — Construction Service
- D — Designer
- E — Other (Check Comments Attached and explain)

# technical data checklist

3-16

## F. FIRE PROTECTION

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
F-1	Special fire protection systems or features (detection and suppression equipment, hazards, etc.)	NR			
	Other Fire Protection Considerations (List and number items)				

**REQUIRED OR NOT REQUIRED** — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

**TO BE DETERMINED** — Information needed but not currently available. Enter code for information source.

**COMMENT ATTACHED** — Significant information summarized or explained and attached.

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**\* BY WHOM** (Check and insert appropriate letter)

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- B — Using Service
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- E — Other (Check Comments Attached and explain)

# technical data checklist

3-17

1. COMPONENT <b>ARMY</b>	<b>FY 19 <u>94</u> MILITARY CONSTRUCTION PROJECT DATA</b>			2. DATE <b>29 October 93</b>	
3. INSTALLATION AND LOCATION <b>Fort Campbell, Kentucky</b>		4. PROJECT TITLE <b>INTERIOR/EXTERIOR LIGHTING REPLACEMENT</b>			
5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER <b>ECIP #1</b>	8. PROJECT COST (\$000) <b>\$340</b>		
<b>9. COST ESTIMATES</b>					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
Primary Facility					
Interior and Exterior Light Fixtures		Lot	1	290,000	290
Subtotal					290
Contingency (10%)					30
Total Contract Cost					320
Supervision, Inspection and Overhead (5.5%)					20
Total Request					340
<b>10. DESCRIPTION OF PROPOSED CONSTRUCTION</b>  <p>The existing interior lighting is a combination of standard efficiency fluorescent fixtures, incandescents, and incandescent exit signs. The existing exterior lighting is a combination of 175W and 400W mercury vapor and 100W high pressure sodium fixtures. The proposed project will replace the interior fluorescent fixtures with T-8's, incandescents with compact fluorescents, and exit signs with LED's. The implementation of this project will save 1800 MBtu/Yr of electrical energy. The first year savings is \$44,078 and the Savings to Investment Ratio (SIR) is 1.44.</p>					
<b>11. REQUIREMENT</b>  <p>Project: The proposed interior/exterior lighting project replaces thirty-six (36) buildings and five (5) exterior locations lighting with energy efficient lighting.</p> <p>Requirement: The project is required to reduce the energy consumption of lighting and to comply with the Army Energy Resources Management Plan (ERMP) and Executive Order 12759. The proposed project will reduce annual energy consumption by 1800 MBTU/YR and annual energy cost by \$32,074.</p> <p>Current Situation: The existing lighting in building numbers 6734, 6735, 6736, 6737, 6738, 6740, 6744, 6773, 6894, 6789, 6890, 6901, 6903, 6904, 6905, 6906, 6907, 6908, 6913, 6914, 6915, 6916, 6924, 6924A, 6925, 6926, 6932, 6933, 6934, 6935, 6991, 6993, 6995, 6997, 7855, 7856 and exterior areas at Cole Park, Drennan Park, Stryker Village, Gardner Hills, Werner Park is inefficient fluorescent, incandescent and mercury vapor.</p>					



1. COMPONENT ARMY	FY 19 <u>94</u> MILITARY CONSTRUCTION PROJECT DATA		2. DATE 29 October 93									
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<p>Impact if not provided: If the proposed project is not funded, a reduction of 1800 MBtu/YR cannot be achieved, and excessive amounts of energy will continue to be used. There will be no contribution to energy reduction goals established for United States Army facilities by Army Headquarters.</p> <p style="text-align: center;">_____ Colonel, USA Commanding</p> <table> <tr> <td>ESTIMATED CONSTRUCTION START:</td> <td>September 1994</td> <td>INDEX:</td> </tr> <tr> <td>ESTIMATED MIDPOINT OF CONSTRUCTION:</td> <td>April 1995</td> <td>INDEX:</td> </tr> <tr> <td>ESTIMATED CONSTRUCTION COMPLETION:</td> <td>November 1995</td> <td>INDEX:</td> </tr> </table> <p style="text-align: center;">DETAILED JUSTIFICATIONS</p> <p>D1. GENERAL</p> <p>The proposed project encompasses the replacement of lighting in thirty-six (36) buildings and five (5) family housing areas. The project will decrease the energy consumption of the lighting system without reducing light levels except where necessary.</p> <p>D2. ACCOMMODATIONS NOW IN USE:</p> <p>The existing lighting systems are comprised of standard efficiency fluorescent, incandescent, and mercury vapor fixtures.</p> <p>D3. ANALYSIS OF DEFICIENCY:</p> <p>Currently, thirty-six (36) buildings and five (5) family housing areas are using standard or low efficiency fixtures for lighting. The purpose of this project is to replace the existing lighting with new light fixtures which are much more efficient. The current deficiency results in large amounts of energy usage to maintain adequate lighting.</p>				ESTIMATED CONSTRUCTION START:	September 1994	INDEX:	ESTIMATED MIDPOINT OF CONSTRUCTION:	April 1995	INDEX:	ESTIMATED CONSTRUCTION COMPLETION:	November 1995	INDEX:
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<p>D4. CONSIDERATION OF ALTERNATIVES:</p> <p>The only alternatives to proposed project are to install lower efficiency light fixtures. The disadvantages of using lower efficiency light fixtures is that less energy savings can be realized without significantly reducing the construction cost. If a less efficient light fixture is selected, the project would have a lower SIR.</p> <p>D5. CRITERIA FOR PROPOSED PROJECT:</p> <p>The proposed project will conform with all applicable federal and United States Army Regulations.</p> <p>D6. PROGRAM FOR RELATED EQUIPMENT:</p> <p>No equipment funded from appropriations other than MCA are required.</p> <p>D7. DISPOSAL OF PRESENT ASSETS:</p> <p>Light fixtures in thirty-six (36) buildings and five (5) family housing areas will be disposed.</p> <p>D8. SURVIVAL FACILITIES:</p> <p>The proposed project is not suitable for inclusion of protective shelters.</p> <p>D9. SUMMARY OF ENVIRONMENTAL CONSEQUENCES:</p> <p>The proposed project has been analyzed and will not adversely impact the environment. Energy savings resulting from the project will conserve natural resources.</p> <p>D10. EVALUATION OF FLOOD HAZARDS AND ENCROACHMENT ON WETLANDS:</p> <p>It has been determined that these facilities are not located in a flood plain and they do not encroach on wetlands.</p> <p>D11. ECONOMIC JUSTIFICATION:</p> <p>The proposed project qualifies under ECIP Guidelines in AR-415-15. SIR for the project is 1.44 with a simple payback of 7.77 years. See Economic Analysis, SRP-1</p>			

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<p>D12. UTILITY AND COMMUNICATION SUPPORT:</p> <p>A. No related utility support projects are programmed. Adequate utilities are available to support the project.</p> <p>B. No telecommunication support is required.</p> <p>D13. PROTECTION OF HISTORIC PLACES AND ARCHEOLOGICAL SITES:</p> <p>The project involves the replacement of light fixtures located in existing buildings and family housing areas. Review procedures have been implemented for this project in accordance with 36 CFT 800. The review has established that there will be no effect.</p> <p>D14. PROJECT DEVELOPMENT BROCHURE (PART 1):</p> <p>A Project Development Brochure was prepared on 29 October 93 and is attached as a part of the programming documentation.</p> <p>D15. ENERGY REQUIREMENTS:</p> <p>The proposed project will reduce present energy consumption by 1800 MBtu/Yr at the cost savings of \$32,074 per year. See Energy Requirements Appraisal (ERA) in Special Requirements, Paragraph 3 (SRP-3).</p> <p>D16. PROVISION FOR THE HANDICAPPED:</p> <p>No provisions for the handicapped will be made since the scope of the project is in no way applicable to designing for the handicapped.</p> <p>D17. REAL PROPERTY MAINTENANCE ACTIVITY (RPMA) ANALYSIS:</p> <p>A. Physical impact: There will be light fixtures removed and replace by the same number of light fixtures. No new structures will be added.</p>		

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<p><b>B. Operations and Maintenance (O&amp;M) impact:</b></p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;"><u>YEAR</u></th> <th style="text-align: center;"><u>O&amp;M</u> <u>NET CHANGE (\$000)</u></th> </tr> </thead> <tbody> <tr> <td>1994</td> <td style="text-align: center;">0.0</td> </tr> <tr> <td>(BOD)</td> <td style="text-align: center;">0.0</td> </tr> <tr> <td>1995</td> <td style="text-align: center;">1226</td> </tr> <tr> <td>1996</td> <td style="text-align: center;">1275</td> </tr> </tbody> </table> <p><b>C. Backlog of Maintenance and Repair (BMAR) impact:</b></p> <p>There will be no net change in the number of fixtures or in fixture life expectancy. There will be no effect on BMAR.</p> <p><b>D18. COMMERCIAL ACTIVITIES:</b></p> <p>The proposed project is not a "New Start Expansion" as defined by DA Circular 235-1. The project has been reviewed in light of the requirements of commercial and industrial facilities. It has been determined that whereas the project does not affect commercial facilities, the requirements of DA Circular 235-1 does not apply.</p>			<u>YEAR</u>	<u>O&amp;M</u> <u>NET CHANGE (\$000)</u>	1994	0.0	(BOD)	0.0	1995	1226	1996	1275
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<p><b>Life Cycle Cost Analysis</b>  <b>Project Title: Lighting Replacements In Buildings 350</b>  <b>Fiscal Year: 1994</b>  <b>Analysis Date 11/1/93</b>  <b>Economic Life: Fifteen (15) Years</b></p> <p><b>1. INVESTMENT</b></p> <table style="width: 100%;"> <tr><td style="width: 80%;">A. CONSTRUCTION COST</td><td style="text-align: right;">\$311,437</td></tr> <tr><td>B. SIOH</td><td style="text-align: right;">15,572</td></tr> <tr><td>C. DESIGN COST</td><td style="text-align: right;">15,572</td></tr> <tr><td>D. ENERGY CREDIT CALC</td><td style="text-align: right;">-0-</td></tr> <tr><td>E. SALVAGE VALUE</td><td style="text-align: right;">-0-</td></tr> <tr><td>F. TOTAL INVESTMENT</td><td style="text-align: right;">\$342,581</td></tr> </table> <p><b>2. ENERGY SAVINGS</b>  ANALYSIS DATE ANNUAL SAVINGS, UNIT COST &amp; DISCOUNTED SAVINGS</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">FUEL</th> <th style="text-align: center;">COST \$MBtu (1)</th> <th style="text-align: center;">SAVINGS MBtu/YR(2)</th> <th style="text-align: center;">ANNUAL \$ SAVINGS(3)</th> <th style="text-align: center;">DISCOUNT FACTOR(4)</th> <th style="text-align: center;">DISCOUNTED SAVINGS(5)</th> </tr> </thead> <tbody> <tr><td>A. ELECT</td><td style="text-align: center;">6.18</td><td style="text-align: center;">1800</td><td style="text-align: center;">11,124</td><td style="text-align: center;">11.77</td><td style="text-align: center;">130,929</td></tr> <tr><td>B. DIST</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>C. RESID</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>D. NG</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>E. COAL</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>F. DEMAND SAVINGS</td><td></td><td></td><td style="text-align: center;">20,950</td><td></td><td style="text-align: center;">232,964</td></tr> <tr><td>G. TOTAL</td><td></td><td style="text-align: center;">1800</td><td style="text-align: center;">32,074</td><td></td><td style="text-align: center;">363,893</td></tr> </tbody> </table> <p><b>3. NON-ENERGY SAVINGS</b></p> <p>A. ANNUAL RECURRING</p> <table style="width: 100%;"> <tr><td style="width: 40%;">(1)DISCOUNT FACTOR</td><td style="text-align: center;">11.12</td><td style="text-align: right;">1,226</td></tr> <tr><td>(2)DISCOUNTED SAVINGS</td><td></td><td style="text-align: right;">13,633</td></tr> </table> <p>B. NON-RECURRING SAVINGS</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ITEM</th> <th style="text-align: center;">SAVINGS (+) COST (-)(1)</th> <th style="text-align: center;">YEAR OF OCCURRENCE(2)</th> <th style="text-align: center;">DISCOUNT FACTOR</th> <th style="text-align: center;">DISCOUNTED SAVINGS (+) COST (-)(4)</th> </tr> </thead> <tbody> <tr><td>a. Replace Interior</td><td style="text-align: center;">136,425</td><td style="text-align: center;">8</td><td style="text-align: center;">0.73</td><td style="text-align: center;">99,590</td></tr> <tr><td>b. Replace Exterior</td><td style="text-align: center;">25,241</td><td style="text-align: center;">9</td><td style="text-align: center;">0.70</td><td style="text-align: center;">17,669</td></tr> <tr><td>c.</td><td></td><td></td><td></td><td></td></tr> <tr><td>d. Total</td><td style="text-align: center;">161,666</td><td></td><td></td><td style="text-align: center;">117,259</td></tr> </tbody> </table> <p>C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+)/COST(-) <span style="float: right;">130,892</span></p>			A. CONSTRUCTION COST	\$311,437	B. SIOH	15,572	C. DESIGN COST	15,572	D. ENERGY CREDIT CALC	-0-	E. SALVAGE VALUE	-0-	F. TOTAL INVESTMENT	\$342,581	FUEL	COST \$MBtu (1)	SAVINGS MBtu/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)	A. ELECT	6.18	1800	11,124	11.77	130,929	B. DIST						C. RESID						D. NG						E. COAL						F. DEMAND SAVINGS			20,950		232,964	G. TOTAL		1800	32,074		363,893	(1)DISCOUNT FACTOR	11.12	1,226	(2)DISCOUNTED SAVINGS		13,633	ITEM	SAVINGS (+) COST (-)(1)	YEAR OF OCCURRENCE(2)	DISCOUNT FACTOR	DISCOUNTED SAVINGS (+) COST (-)(4)	a. Replace Interior	136,425	8	0.73	99,590	b. Replace Exterior	25,241	9	0.70	17,669	c.					d. Total	161,666			117,259
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<p>SPECIAL REQUIREMENTS PARAGRAPH 1 (SRP-1) (continued)</p> <p>D. PROJECT NON ENERGY QUALIFICTION TEST (1) 25% NON ENERGY CALC</p> <table> <tr> <td>4. FIRST YEAR DOLLAR SAVINGS</td> <td>\$ 44,078</td> </tr> <tr> <td>5. TOTAL NET DISCOUNTED SAVINGS</td> <td>\$494,786</td> </tr> <tr> <td>6. DISCOUNTED SAVINGS RATIO</td> <td>1.44</td> </tr> <tr> <td>7. SIMPLE PAYBACK</td> <td>7.77</td> </tr> </table>			4. FIRST YEAR DOLLAR SAVINGS	\$ 44,078	5. TOTAL NET DISCOUNTED SAVINGS	\$494,786	6. DISCOUNTED SAVINGS RATIO	1.44	7. SIMPLE PAYBACK	7.77
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<p>SPECIAL REQUIREMENTS PARAGRAPH 3 (SRP-3):</p> <p>Energy Requirements Appraisal (ERA)</p> <p>1. Project Description: Replace existing lighting systems with more efficient lighting systems without reducing the light levels.</p> <p>2. Estimated Energy Consumption: The building are currently lit by standard efficiency lighting. The existing lighting system consumes 2707 MBtu/Yr of energy. Replacing the existing lighting with high efficiency lighting will result in 1800 MBtu/Yr of electrical energy savings, a sixty-six percent (66%) reduction in current energy consumption.</p> <p>3. Energy Sources: No new energy sources are required for the proposed project. The use of solar energy for this project is impractical.</p> <p>4. Energy Use Impacts: The proposed project will substantially reduce the consumption of electricity for lighting. The burden on the existing base distribution system will be lessened.</p> <p>5. Energy Conservation: The proposed project will reduce annual energy consumption by 1800 MBtu/Yr with annual energy cost savings of \$32,074. The project complies with Army Resources Management Plan (ERMP) and Executive Order 12759.</p> <p>6. Energy Alternatives: The proposed project represents the greatest possible reduction in energy consumption sixty-six percent (66%), without reducing the current lighting levels. The current levels do not exceed the levels recommended by ASHRAE.</p> <p>7. Energy Effects: The proposed project provides positive environmental effects. It reduces the current energy consumption by sixty-six (66%), effectively reducing the consumption of non-renewable fuel sources. The degrading of environmental standards would not make more efficient energy sources available.</p> <p>8. Basis of Approval: Total energy requirements and alternative fuel sources have been considered and included in this appraisal or discarded as applicable.</p>		

# ENERGY SAVINGS OPPORTUNITY SURVEY FORT CAMPBELL, KENTUCKY

## ECO - 6 PROJECT SUMMARY

BUILDING NUMBER	BUILDING AREA (F <sup>2</sup> )	BASELINE ENERGY (MBTU)	ECO ENERGY (MBTU)	ENERGY SAVINGS (MBTU)	1ST YEAR SAVINGS	INVESTMENT COSTS	SPB (YR)	SIR
6734	3610	35	14	21	\$526	\$6,835	13.00	0.87
6735	2746	37	14	23	546	6,573	12.04	0.94
6736	2581	42	14	28	887	6,172	6.96	1.61
6737	2581	62	21	41	982	6,918	7.04	1.60
6738	2581	47	19	28	487	6,316	12.97	0.88
6740	4141	77	30	47	853	9,848	11.54	0.96
6744	7200	167	62	105	1,891	18,822	9.95	1.14
6773	2581	38	11	27	1,092	7,006	6.42	1.74
6784	2581	52	16	36	935	5,503	5.69	1.91
6789	3610	47	17	30	699	7,198	10.29	1.10
6790	3610	36	14	22	1,042	10,447	10.02	1.11
6901	9303	121	44	77	1,915	18,800	9.86	1.14
6903	2686	41	13	28	1,056	8,392	7.96	1.41
6904	2581	44	17	27	523	5,962	11.40	0.99
6905	2581	47	14	33	1,009	6,005	5.95	1.88
6906	2581	39	12	27	1,065	7,039	6.49	1.72
6907	2581	35	14	21	424	5,261	12.41	0.91
6908	2581	35	12	23	742	5,564	7.50	1.49
6913	2581	36	13	23	565	5,129	9.08	1.24
6914	3610	52	20	32	1,248	11,118	8.91	1.25
6915	3610	26	10	18	800	6,557	8.19	1.36
6916	2581	41	12	29	953	5,765	6.05	1.85
6924	2581	42	15	27	556	5,525	9.93	1.14
6924A	3688	59	19	40	1,215	7,875	6.48	1.73
6925	3610	57	17	40	905	5,131	5.67	1.98
6926	2581	45	15	30	783	5,883	7.51	1.50
6932	2581	39	15	24	495	5,874	11.86	0.95
6933	3610	24	7	17	765	4,404	5.76	0.94
6934	3610	51	19	32	717	8,142	11.36	1.65
6935	2581	62	22	40	1,073	8,073	7.52	1.40
6991	3688	43	14	29	1,094	7,419	6.78	1.75
6993	3688	34	12	22	751	5,978	7.96	1.89
6995	3688	59	19	40	1,201	7,684	6.40	0.81
6997	3568	134	42	92	2,418	14,385	5.95	1.74
7855	10,815	144	58	86	1,744	24,441	14.04	0.61
7856	9607	192	59	133	4,541	29,141	6.42	1.74



# **ENERGY SAVINGS OPPORTUNITY SURVEY FORT CAMPBELL, KENTUCKY**

## **ECO - 6 PROJECT SUMMARY**

BUILDING NUMBER	BUILDING AREA (F <sup>2</sup> )	BASELINE ENERGY (MBTU)	ECO ENERGY (MBTU)	ENERGY SAVINGS (MBTU)	1ST YEAR SAVINGS	INVESTMENT COSTS	SPB (YR)	SIR
STRYKER VILLAGE	N/A	8	2	6	\$80	\$362	4.54	1.53
GARDENER HILLS	N/A	113	33	80	1,110	5,061	4.56	1.53
COLE PARK	N/A	177	51	126	1,746	7,952	4.55	1.53
DRENNAN PARK	N/A	129	37	92	1,272	5,784	4.55	1.53
WERNER PARK	N/A	137	39	96	1,353	6,144	4.54	1.53
TOTALS	134,994	2,707	907	1,800	\$44,078	\$342,581	7.77	1.44

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO6TLT3

LCCID 1.072

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 006-TLT3 TOTAL INTERIOR AND EXTERIOR LIGHTING

FISCAL YEAR 1994 DISCRETE PORTION NAME: LIGHTING

ANALYSIS DATE: 10-13-93 ECONOMIC LIFE 15 YEARS PREPARED BY: KEITH DERRING

1. INVESTMENT

A. CONSTRUCTION COST	\$	311437.	
B. SIOH	\$	15572.	
C. DESIGN COST	\$	15572.	
D. TOTAL COST (1A+1B+1C)	\$	342581.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)			\$ 342581.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1992

FUEL	UNIT COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 6.18	1800.	\$ 11124.	11.77	\$ 130929.
B. DIST	\$ .00	0.	\$ 0.	13.83	\$ 0.
C. RESID	\$ .00	0.	\$ 0.	16.15	\$ 0.
D. NAT G	\$ 4.00	0.	\$ 0.	15.34	\$ 0.
E. COAL	\$ .00	0.	\$ 0.	12.82	\$ 0.
F. PPG	\$ .00	0.	\$ 0.	11.12	\$ 0.
M. DEMAND SAVINGS			\$ 20950.	11.12	\$ 232964.
N. TOTAL		1800.	\$ 32074.		\$ 363893.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$ 1226.
(1) DISCOUNT FACTOR (TABLE A)	11.12	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 13633.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+)/ COST(-) (4)
	(1)	(2)	(3)	
1. REPLACE INTERIOR	\$ 136425.	8	.73	99590.
2. REPLACE EXTERIOR	\$ 25241.	9	.70	17669.
d. TOTAL	\$ 161666.			117259.

LIFE CYCLE COST ANALYSIS SUMMARY  
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)  
INSTALLATION & LOCATION: FT CAMPBELL REGION NOS. 4 CENSUS: 3  
PROJECT NO. & TITLE: 006-TLT3 TOTAL INTERIOR AND EXTERIOR LIGHTING  
FISCAL YEAR 1994 DISCRETE PORTION NAME: LIGHTING  
ANALYSIS DATE: 10-13-93 ECONOMIC LIFE 15 YEARS PREPARED BY: KEITH DERRING

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4)\$ 130892.  
4. FIRST YEAR DOLLAR SAVINGS  $2N3+3A+(3B1d/(YRS\ ECONOMIC\ LIFE))$ \$ 44078.  
5. SIMPLE PAYBACK PERIOD (1G/4) 7.77 YEARS  
6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 494786.  
7. SAVINGS TO INVESTMENT RATIO (SIR)=(5 / 1G)= 1.44  
(IF < 1 PROJECT DOES NOT QUALIFY)  
8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 6.58 %

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6734

BUILDING USE:

HOURS/DAY 9  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
0.2 LAMP @ 96 W/FIXT = 0 WATTS  
0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0.3 LAMP @ 144 W/FIXT = 0 WATTS  
0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
0.4 LAMP @ 192 W/FIXT = 0 WATTS  
28.4 LAMP @ 151.2 W/FIXT = 4233. WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
0.4 LAMP @ 88 W/FIXT = 0 WATTS  
0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
0.2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
28.2 LAMP W/ REFLECTORS 58 W/FIXT = 1624 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.23

TOTAL REPLACEMENT KW 1.62

BASELINE ENERGY CONSUMPTION 33.80 MBTU

REPLACEMENT ENERGY CONSUMPTION 12.97 MBTU

NET ENERGY SAVINGS 20.84 MBTU/YR

NET DOLLAR SAVINGS \$497.98

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 2 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6734

LAMP USE:

HOURS/DAY 9

DAYS/WEEK 5

PEAK USE 1 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
0 LAMPS @ 52 WATTS =	0 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
1 LAMPS @ 100 WATTS =	100 WATTS

TOTAL EXISTING WATTS 100

BASELINE ENERGY CONSUMPTION 0.80 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
0 LAMPS @ 13 WATTS =	0 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
1 LAMPS @ 28 WATTS =	28 WATTS

TOTAL REPLACEMENT WATTS 26

REPLACEMENT ENERGY CONSUMPTION 0.21 MBTU

NET ENERGY SAVINGS 0.59 MBTU/YR

NET DOLLAR SAVINGS \$14.12

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 13:47:29

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6734

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

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U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6734  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 13:47:29

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS 1.00 EA EELEA	1				41	0	31	2	74
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR 28.00 EA EELEB	16				544	2	3,808	190	4,544
TOTAL DIVISION 16 ELECTRICAL		18				585	2	3,839	192	4,618
TOTAL FACILITY AA. ELECTRICAL		18				585	2	3,839	192	4,618
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE		18				585	2	3,839	192	4,618
TOTAL BASE BID		18				585	2	3,839	192	4,618
TOTAL ADDITIVE		0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY		18				585	2	3,839	192	4,618

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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PROJECT NOTES

SUMMARY PAGE 1

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PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

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 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER	FCCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL		10.0%	0.0%	7.5%	2.5%	0.0%			
	1.00 EA	4,618	462	0	381	137	0		5,597	5597.34
BID ITEM TOTAL	1.00 EA	4,618	462	0	381	137	0		5,597	5597.34
TOTAL BASE BID		4,618	462	0	381	137	0		5,597	
TOTAL ADDITIVE		0	0	0	0	0	0		0	
TOTAL INCL ADD		4,618	462	0	381	137	0		5,597	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

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U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
	1. BUILDING TO THE 5 FOOT LINE	1.00	EA	5,597		5,597	5597.30
	TOTAL CURRENT CONTRACT COST			5,597	0	5,597	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			5,597	0	5,597	
	Government-Furnished Property			0		0	
	SUBTOTAL			5,597	0	5,597	
	Contingencies	10.0%		560	0	560	
	SUBTOTAL			6,157	0	6,157	
	SIOH (S&A)	5.5%		339	0	339	
	CURRENT WORKING ESTIMATE			6,496	0	6,496	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

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U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
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CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	18	585	2	4,031		4,618	100.0%	0	4,618
	TOTAL DIRECT				18	585	2	4,031		4,618	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,618	462	10.0%	0.0	381	7.5%	2.5%	0.0%	5,597	100.0%	5597.34
	TOTAL OVERHEAD & PROFIT			462	10.0%		381	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	18	585	2	3,839	192	4,618
TOTAL DIRECT	18	585	2	3,839	192	4,618

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	18	585	2	3,839	192	4,618
TOTAL DIRECT	18	585	2	3,839	192	4,618

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

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U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
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EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTH	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6734

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LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	18	585
TOTAL PROJECT MANHOURS								18	585

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6734E6

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# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6735

BUILDING USE:

HOURS/DAY 10

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0.2 LAMP @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0.3 LAMP @ 144 W/FIXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 0.4 LAMP @ 192 W/FIXT = 0 WATTS  
 26.4 LAMP @ 151.2 W/FIXT = 3931. WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
 0.4 LAMP @ 88 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.93

BASELINE ENERGY CONSUMPTION 34.87 MBTU

NET ENERGY SAVINGS 21.50 MBTU/YR

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 26.2 LAMP W/ REFLECTORS 58 W/FIXT = 1508 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.51

REPLACEMENT ENERGY CONSUMPTION 13.38 MBTU

NET DOLLAR SAVINGS \$475.73

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6735

LAMP USE:

HOURS/DAY 10

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

### ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
0 LAMPS @	52 WATTS =	0 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
2 LAMPS @	90 WATTS =	180 WATTS
1 LAMPS @	100 WATTS =	100 WATTS

TOTAL EXISTING WATTS 280

BASELINE ENERGY CONSUMPTION 2.48 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
0 LAMPS @	13 WATTS =	0 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
3 LAMPS @	26 WATTS =	78 WATTS

TOTAL REPLACEMENT WATTS 78

REPLACEMENT ENERGY CONSUMPTION 0.69 MBTU

NET ENERGY SAVINGS 1.79 MBTU/YR

NET DOLLAR SAVINGS \$39.66

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:06:34

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6735

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS H-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

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AA. ELECTRICAL.....	1

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6735  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:06:34

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS 3.00 EA EELEA	4				124	0	93	5	221
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR 26.00 EA EELEB	15				505	2	3,536	177	4,220
TOTAL DIVISION 16 ELECTRICAL		19				629	2	3,629	181	4,441
TOTAL FACILITY AA. ELECTRICAL		19				629	2	3,629	181	4,441
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE		19				629	2	3,629	181	4,441
TOTAL BASE BID		19				629	2	3,629	181	4,441
TOTAL ADDITIVE		0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY		19				629	2	3,629	181	4,441

\* \* \* END OF DETAIL REPORT \* \* \*

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	4,441	444	0	366	131	0	5,383	5382.85
<hr/>										
BID ITEM TOTAL		1.00 EA	4,441	444	0	366	131	0	5,383	5382.85
<hr/>										
TOTAL BASE BID			4,441	444	0	366	131	0	5,383	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
<hr/>										
TOTAL INCL ADD			4,441	444	0	366	131	0	5,383	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

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PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	5,383		5,383	5382.90
	TOTAL CURRENT CONTRACT COST		5,383	0	5,383	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		5,383	0	5,383	
	Government-Furnished Property		0		0	
	SUBTOTAL		5,383	0	5,383	
	Contingencies	10.0%	538	0	538	
	SUBTOTAL		5,921	0	5,921	
	SIOH (S&A)	5.5%	326	0	326	
	CURRENT WORKING ESTIMATE		6,247	0	6,247	
	Estimated Construction Time	365 Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	19	629	2	3,810		4,441 100.0%	0	4,441
	TOTAL DIRECT				19	629	2	3,810		4,441 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

-----		*** OVERHEAD ***			-----			**** PROFIT ****		-----			***** TOTAL CONTRACT *****		
ID	CONTRACTOR	PM	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT	COST	
AA	GENERAL/PRIME		4,441	444	10.0%	0.0	366	7.5%	2.5%	0.0%	5,383	100.0%	5382.85		
				-----			-----								
				444	10.0%		366	7.5%							
			TOTAL OVERHEAD & PROFIT												

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

3-53

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	19	629	2	3,629	181	4,441
TOTAL DIRECT	19	629	2	3,629	181	4,441

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

3-54

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	19	629	2	3,629	181	4,441
TOTAL DIRECT	19	629	2	3,629	181	4,441

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6735E6

3-55

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS									1.40	1.40	1	2	
TOTAL PROJECT EQUIPMENT HOURS											1	2	

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6735

TIME 14:06:34

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	19	629
TOTAL PROJECT MANHOURS								19	629

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6736

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 13 2 LAMP @ 96 W/FIXT = 1248 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 119.4 W/FIXT = 0 WATTS  
 14 4 LAMP @ 192 W/FIXT = 2688 WATTS  
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 13 1 LAMP W/ REFLECTORS 37 W/FIXT = 481 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 14 2 LAMP W/ REFLECTORS 58 W/FIXT = 812 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.94

TOTAL REPLACEMENT KW 1.29

BASELINE ENERGY CONSUMPTION 41.90 MBTU

REPLACEMENT ENERGY CONSUMPTION 19.76 MBTU

NET ENERGY SAVINGS 28.14 MBTU/YR

NET DOLLAR SAVINGS \$547.94



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:23:48

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6736

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N  
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by Building Systems Design, Inc.  
Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

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DETAILED ESTIMATE

DETAIL PAGE

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6736  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:23:48

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	13.00 EA EELEB		7	232		1	1,586	79	1,898
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	14.00 EA EELEB		8	272		1	1,904	95	2,272
TOTAL DIVISION 16 ELECTRICAL					15	504	2	3,490	175	4,170
TOTAL FACILITY AA. ELECTRICAL					15	504	2	3,490	175	4,170
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					15	504	2	3,490	175	4,170
TOTAL BASE BID					15	504	2	3,490	175	4,170
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					15	504	2	3,490	175	4,170

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

3-61

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,170	10.0% 417	0.0% 0	7.5% 344	2.5% 123	0.0% 0	5,055	5054.64
BID ITEM TOTAL		1.00 EA	4,170	417	0	344	123	0	5,055	5054.64
TOTAL BASE BID			4,170	417	0	344	123	0	5,055	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,170	417	0	344	123	0	5,055	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	5,055		5,055	5054.60
TOTAL CURRENT CONTRACT COST			5,055	0	5,055	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%	0	0	0	
ESCALATED CONTRACT COST			5,055	0	5,055	
Government-Furnished Property			0		0	
SUBTOTAL			5,055	0	5,055	
Contingencies		10.0%	505	0	505	
SUBTOTAL			5,560	0	5,560	
SIOH (S&A)		5.5%	306	0	306	
CURRENT WORKING ESTIMATE			5,866	0	5,866	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	15	504	2	3,665	4,170	100.0%	0	4,170
	TOTAL DIRECT				15	504	2	3,665	4,170	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,170	417	10.0%	0.0		344	7.5%	2.5%	0.0%		5,055	100.0%		5054.64
	TOTAL OVERHEAD & PROFIT			417	10.0%			344	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
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CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	504	2	3,490	175	4,170
TOTAL DIRECT	15	504	2	3,490	175	4,170

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	504	2	3,490	175	4,170
TOTAL DIRECT	15	504	2	3,490	175	4,170

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6736E6

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

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EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSHP	OWNS	OVTM	OWNRSHP	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS										1	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6736

TIME 14:23:48

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	15	503
TOTAL PROJECT MANHOURS								15	503

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6737

BUILDING USE:

HOURS/DAY 14  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
2.2 LAMP @ 96 W/FIXT = 192 WATTS  
0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0.3 LAMP @ 144 W/FIXT = 0 WATTS  
0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
17.4 LAMP @ 192 W/FIXT = 3264 WATTS  
10.4 LAMP @ 151.2 W/FIXT = 1512 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
0.4 LAMP @ 88 W/FIXT = 0 WATTS  
0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.97

BASELINE ENERGY CONSUMPTION 61.70 MBTU

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
2.1 LAMP W/ REFLECTORS 37 W/FIXT = 74 WATTS  
0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
27.2 LAMP W/ REFLECTORS 58 W/FIXT = 1566 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.64

REPLACEMENT ENERGY CONSUMPTION 20.37 MBTU

NET ENERGY SAVINGS 41.33 MBTU/YR

NET DOLLAR SAVINGS \$726.53

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:30:36

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6737

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N  
COMPOSER Plus Copyright (C) 1985, 1988  
by Building Systems Design, Inc.  
Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-72

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6737  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:30:36

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100		2.00 EA EELEB		1	36	0	244	12	292	
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100		27.00 EA EELEB		16	524	2	3,672	184	4,382	
TOTAL DIVISION 16 ELECTRICAL					17	560	2	3,916	196	4,674
TOTAL FACILITY AA. ELECTRICAL					17	560	2	3,916	196	4,674
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					17	560	2	3,916	196	4,674
TOTAL BASE BID					17	560	2	3,916	196	4,674
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					17	560	2	3,916	196	4,674

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-74



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-75

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6737

TIME 14:30:36

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR	FCR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,674	10.0% 467	0.0% 0	7.5% 386	2.5% 138	0.0% 0	5,665	5665.13
BID ITEM TOTAL		1.00 EA	4,674	467	0	386	138	0	5,665	5665.13
TOTAL BASE BID			4,674	467	0	386	138	0	5,665	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,674	467	0	386	138	0	5,665	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	5,665		5,665	5665.10
	TOTAL CURRENT CONTRACT COST		5,665	0	5,665	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		5,665	0	5,665	
	Government-Furnished Property		0		0	
	SUBTOTAL		5,665	0	5,665	
	Contingencies	10.0%	567	0	567	
	SUBTOTAL		6,232	0	6,232	
	SIOH (S&A)	5.5%	343	0	343	
	CURRENT WORKING ESTIMATE		6,574	0	6,574	
	Estimated Construction Time	365 Days				

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	17	560	2	4,112		4,674	100.0%	0	4,674
	TOTAL DIRECT				17	560	2	4,112		4,674	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,674	467	10.0%	0.0	386	7.5%	2.5%	0.0%	5,665	100.0%	5665.12
	TOTAL OVERHEAD & PROFIT			467	10.0%		386	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-79

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	17	560	2	3,916	196	4,674
TOTAL DIRECT	17	560	2	3,916	196	4,674

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-80

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	17	560	2	3,916	196	4,674
TOTAL DIRECT	17	560	2	3,916	196	4,674

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-81

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY	UPB	**** TOTAL ****	COST
EMI20 SMALL TOOLS									1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS											2	2



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6737

TIME 14:30:36

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	17	560
TOTAL PROJECT MANHOURS								17	560

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6737E6

3-83

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6738

BUILDING USE:

HOURS/DAY 15  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
0 2 LAMP @ 96 W/FIXT = 0 WATTS  
7 2 LAMP @ 75.6 W/FIXT = 529.2 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
0 4 LAMP @ 192 W/FIXT = 0 WATTS  
20 4 LAMP @ 151.2 W/FIXT = 3024 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
7 1 LAMP W/ REFLECTORS 37 W/FIXT = 259 WATTS  
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
20 2 LAMP W/ REFLECTORS 58 W/FIXT = 1160 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.55

TOTAL REPLACEMENT KW 1.42

BASELINE ENERGY CONSUMPTION 47.28 MBTU

REPLACEMENT ENERGY CONSUMPTION 18.88 MBTU

NET ENERGY SAVINGS 28.40 MBTU/YR

NET DOLLAR SAVINGS \$477.65

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:37:25

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6738

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N  
COMPOSER Plus Copyright (C) 1985, 1988  
by Building Systems Design, Inc.  
Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-85

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6738  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:37:25

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54	17.84	0.07	122.00	6.10	146.01	
WC=1100	REFLECTOR	7.00	EA EELEB	4	125	0	854	43	1,022	
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29	
WC=1100	REFLECTOR	20.00	EA EELEB	12	388	2	2,720	136	3,246	
TOTAL DIVISION 16 ELECTRICAL		16			513	2	3,574	179	4,268	
TOTAL FACILITY AA. ELECTRICAL		16			513	2	3,574	179	4,268	
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE		16			513	2	3,574	179	4,268	
TOTAL BASE BID		16			513	2	3,574	179	4,268	
TOTAL ADDITIVE		0			0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY		16			513	2	3,574	179	4,268	

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-87

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-88

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL		10.0%	0.0%	7.5%	2.5%	0.0%		
	1.00 EA	4,268	427	0	352	126	0	5,173	5173.03
<hr/>									
BID ITEM TOTAL	1.00 EA	4,268	427	0	352	126	0	5,173	5173.03
<hr/>									
TOTAL BASE BID		4,268	427	0	352	126	0	5,173	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
<hr/>									
TOTAL INCL ADD		4,268	427	0	352	126	0	5,173	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-89

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	5,173		5,173	5173.00
TOTAL CURRENT CONTRACT COST				5,173	0	5,173	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				5,173	0	5,173	
Government-Furnished Property				0		0	
SUBTOTAL				5,173	0	5,173	
Contingencies		10.0%		517	0	517	
SUBTOTAL				5,690	0	5,690	
SIOH (S&A)		5.5%		313	0	313	
CURRENT WORKING ESTIMATE				6,003	0	6,003	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-90



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	16	513	2	3,753		4,268	100.0%	0	4,268
	TOTAL DIRECT				16	513	2	3,753		4,268	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-91

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,268	427	10.0%	0.0	352	7.5%	2.5%	0.0%	5,173	100.0%	5173.04
	TOTAL OVERHEAD & PROFIT			427	10.0%		352	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-92

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	16	513	2	3,574	179	4,268
TOTAL DIRECT	16	513	2	3,574	179	4,268

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

3-93

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	16	513	2	3,574	179	4,268
TOTAL DIRECT	16	513	2	3,574	179	4,268

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6738E6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS									1.40	1.40	1	2	
TOTAL PROJECT EQUIPMENT HOURS											1	2	

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6738

TIME 14:37:25

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	16	513
TOTAL PROJECT MANHOURS								16	513

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6740

BUILDING USE:

HOURS/DAY 14

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0.2 LAMP @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0.3 LAMP @ 144 W/FIXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 0.4 LAMP @ 192 W/FIXT = 0 WATTS  
 41.4 LAMP @ 151.2 W/FIXT = 6199 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
 0.4 LAMP @ 88 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 6.20

BASELINE ENERGY CONSUMPTION 76.99 MBTU

NET ENERGY SAVINGS 47.46 MBTU/YR

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 41.2 LAMP W/ REFLECTORS 58 W/FIXT = 2378 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 2.38

REPLACEMENT ENERGY CONSUMPTION 29.53 MBTU

NET DOLLAR SAVINGS \$834.20

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:44:17

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6740

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N  
COMPOSER Plus Copyright (C) 1985, 1988  
by Building Systems Design, Inc.  
Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-98



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740  
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:44:17

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 41.00 EA EELEB	24				796	3	5,576	279	6,654
TOTAL DIVISION 16 ELECTRICAL	24				796	3	5,576	279	6,654
TOTAL FACILITY AA. ELECTRICAL	24				796	3	5,576	279	6,654
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	24				796	3	5,576	279	6,654
TOTAL BASE BID	24				796	3	5,576	279	6,654
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	24				796	3	5,576	279	6,654

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-100

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-101

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	6,654	665	0	549	197	0	8,065	8065.10
BID ITEM TOTAL		1.00 EA	6,654	665	0	549	197	0	8,065	8065.10
TOTAL BASE BID			6,654	665	0	549	197	0	8,065	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			6,654	665	0	549	197	0	8,065	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-102

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	8,065		8,065	8065.10
TOTAL CURRENT CONTRACT COST				8,065	0	8,065	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				8,065	0	8,065	
Government-Furnished Property				0		0	
SUBTOTAL				8,065	0	8,065	
Contingencies		10.0%		807	0	807	
SUBTOTAL				8,872	0	8,872	
SIOH (S&A)		5.5%		488	0	488	
CURRENT WORKING ESTIMATE				9,360	0	9,360	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-103

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	SUBCON W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	24	796	3	5,855		6,654	100.0%	0	6,654
	TOTAL DIRECT				24	796	3	5,855		6,654	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-104

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		6,654	665	10.0%	0.0	549	7.5%	2.5%	0.0%	8,065	100.0%	8065.11
	TOTAL OVERHEAD & PROFIT			665	10.0%		549	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-105

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	24	796	3	5,576	279	6,654
TOTAL DIRECT	24	796	3	5,576	279	6,654

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	24	796	3	5,576	279	6,654
TOTAL DIRECT	24	796	3	5,576	279	6,654

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6740E6

3-107

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE *** ADJ FACTOR ADJUSTD BOOK OP -- HRLY --- UPB **** TOTAL ****												
EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20 SMALL TOOLS									1.40	1.40	2	3
TOTAL PROJECT EQUIPMENT HOURS											2	3

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6740

TIME 14:44:17

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	24	796
TOTAL PROJECT MANHOURS								24	796

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6744

BUILDING USE:

HOURS/DAY 14

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FXT = 0 WATTS  
 0.2 LAMP @ 96 W/FXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FXT = 0 WATTS  
 0.3 LAMP @ 144 W/FXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FXT = 0 WATTS  
 0.4 LAMP @ 192 W/FXT = 0 WATTS  
 49.4 LAMP @ 151.2 W/FXT = 7408.8 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FXT = 0 WATTS  
 0.4 LAMP @ 88 W/FXT = 0 WATTS  
 0.2 LAMP U @ 96 W/FXT = 0 WATTS  
 0.2 LAMP U @ 75.6 W/FXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FXT = 0 WATTS  
 36.2 LAMP @ 168 W/FXT = 6048 WATTS

TOTAL EXISTING KW 13.46

BASELINE ENERGY CONSUMPTION 167.12 MBTU

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FXT = 0 WATTS  
 49.2 LAMP W/ REFLECTORS 58 W/FXT = 2842 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FXT = 0 WATTS

#### 8 FOOT

36.1 LAMP W/ REFLECTORS 58 W/FXT = 2088 WATTS

TOTAL REPLACEMENT KW 4.93

REPLACEMENT ENERGY CONSUMPTION 61.23 MBTU

NET ENERGY SAVINGS 105.90 MBTU/YR

NET DOLLAR SAVINGS \$1,861.48

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:51:25

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6744

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-111

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS H-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6744  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:51:25

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	49.00 EA EELEB		29		951	4	6,664	333	7,952
CD=3 EL 7007	8 FT 1 LAMP W/ REFLECTOR	*** UNIT COSTS: ***			0.54	17.84	0.07	109.00	5.45	132.36
WC=1100		36.00 EA EELEB		19		642	3	3,924	196	4,765
TOTAL DIVISION 16 ELECTRICAL					48	1,594	6	10,588	529	12,717
TOTAL FACILITY AA. ELECTRICAL					48	1,594	6	10,588	529	12,717
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					48	1,594	6	10,588	529	12,717
TOTAL BASE BID					48	1,594	6	10,588	529	12,717
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					48	1,594	6	10,588	529	12,717

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-113

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-114



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	12,717	10.0% 1,272	0.0% 0	7.5% 1,049	2.5% 376	0.0% 0	15,414	15414.34
BID ITEM TOTAL		1.00 EA	12,717	1,272	0	1,049	376	0	15,414	15414.34
TOTAL BASE BID			12,717	1,272	0	1,049	376	0	15,414	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			12,717	1,272	0	1,049	376	0	15,414	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-115

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	15,414		15,414	15414.30
TOTAL CURRENT CONTRACT COST				15,414	0	15,414	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				15,414	0	15,414	
Government-Furnished Property				0		0	
SUBTOTAL				15,414	0	15,414	
Contingencies		10.0%		1,541	0	1,541	
SUBTOTAL				16,956	0	16,956	
SIOH (S&A)		5.5%		933	0	933	
CURRENT WORKING ESTIMATE				17,888	0	17,888	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-116

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	48	1,594	6	11,117		12,717	100.0%	0	12,717
	TOTAL DIRECT				48	1,594	6	11,117		12,717	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-117

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT PCT	HOFC%	**** PROFIT **** AMOUNT PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT PCT	UNIT COST
AA	GENERAL/PRIME		12,717	1,272 10.0%	0.0	1,049 7.5%	2.5%	0.0%	15,414 100.0%	15414.34
	TOTAL OVERHEAD & PROFIT			1,272 10.0%		1,049 7.5%				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-118

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	48	1,594	6	10,588	529	12,717
TOTAL DIRECT	48	1,594	6	10,588	529	12,717

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-119

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	48	1,594	6	10,588	529	12,717
TOTAL DIRECT	48	1,594	6	10,588	529	12,717

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-120

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSEP	OWNS	OVTH	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	***** TOTAL *****	COST
EMI20 SMALL TOOLS								1.40	1.40	4	6
TOTAL PROJECT EQUIPMENT HOURS										4	6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6744

TIME 14:51:25

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	-- UPB RATE	**** TOTAL HOURS	**** COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	48	1,594
TOTAL PROJECT MANHOURS								48	1,594

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6744E6

3-122



# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6773

BUILDING USE:

HOURS/DAY 8

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0 2 LAMP @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 27 4 LAMP @ 192 W/FIXT = 5184 WATTS  
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 0 1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 27 2 LAMP W/ REFLECTORS 58 W/FIXT = 1556 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.18

TOTAL REPLACEMENT KW 1.57

BASELINE ENERGY CONSUMPTION 96.79 MBTU

REPLACEMENT ENERGY CONSUMPTION 11.11 MBTU

NET ENERGY SAVINGS 25.68 MBTU/YR

NET DOLLAR SAVINGS \$670.53

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6773

LAMP USE:

HOURS/DAY 6

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
5 LAMPS @	52 WATTS =	260 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
0 LAMPS @	100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 260

BASELINE ENERGY CONSUMPTION 1.38 MBTU

NET ENERGY SAVINGS 1.03 MBTU/YR

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
5 LAMPS @	13 WATTS =	65 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
0 LAMPS @	26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 65

REPLACEMENT ENERGY CONSUMPTION 0.35 MBTU

NET DOLLAR SAVINGS \$6.43

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 14:58:08

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6773

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-125

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

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DETAILED ESTIMATE DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

\* \* \* END TABLE OF CONTENTS \* \* \*

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6773  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 14:58:08

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)									
CD=3 EL 6105 SURF SQ W/1 13W BIAXIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	27.80	1.39	70.45
WC=1100 WHITE ACRYLIC LENS 5.00 EA EELEA	6				206	0	139	7	352
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 27.00 EA EELEB	16				524	2	3,672	184	4,382
TOTAL DIVISION 16 ELECTRICAL	22				731	2	3,811	191	4,734
TOTAL FACILITY AA. ELECTRICAL	22				731	2	3,811	191	4,734
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	22				731	2	3,811	191	4,734
TOTAL BASE BID	22				731	2	3,811	191	4,734
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	22				731	2	3,811	191	4,734

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-127

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-128

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6773

TIME 14:58:08

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,734	10.0% 473	0.0% 0	7.5% 391	2.5% 140	0.0% 0	5,738	5738.13
BID ITEM TOTAL		1.00 EA	4,734	473	0	391	140	0	5,738	5738.13
TOTAL BASE BID			4,734	473	0	391	140	0	5,738	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,734	473	0	391	140	0	5,738	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-129

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	5,738		5,738	5738.10
	TOTAL CURRENT CONTRACT COST			5,738	0	5,738	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			5,738	0	5,738	
	Government-Furnished Property			0		0	
	SUBTOTAL			5,738	0	5,738	
	Contingencies	10.0%		574	0	574	
	SUBTOTAL			6,312	0	6,312	
	SIOH (S&A)	5.5%		347	0	347	
	CURRENT WORKING ESTIMATE			6,659	0	6,659	

Estimated Construction Time 365 Days



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	22	731	2	4,002	4,734 100.0%	0	4,734
	TOTAL DIRECT				22	731	2	4,002	4,734 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-131

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND% OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,734	473	10.0%	0.0	391	7.5%	2.5% 0.0%	5,738	100.0%	5738.13
	TOTAL OVERHEAD & PROFIT			473	10.0%		391	7.5%				

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	22	731	2	3,811	191	4,734
TOTAL DIRECT	22	731	2	3,811	191	4,734

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-133

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:08

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	22	731	2	3,811	191	4,734
TOTAL DIRECT	22	731	2	3,811	191	4,734

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6773E6

3-134

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:06

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6773

TIME 14:58:03

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	22	730
TOTAL PROJECT MANHOURS								22	730

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6784

BUILDING USE:

HOURS/DAY 14

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.76 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0.2 LAMP @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0.3 LAMP @ 144 W/FIXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 20.4 LAMP @ 192 W/FIXT = 3840 WATTS  
 2.4 LAMP @ 151.2 W/FIXT = 302.4 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
 0.4 LAMP @ 88 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 22.2 LAMP W/ REFLECTORS 58 W/FIXT = 1276 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.14

TOTAL REPLACEMENT KW 1.28

BASELINE ENERGY CONSUMPTION 51.44 MBTU

REPLACEMENT ENERGY CONSUMPTION 15.85 MBTU

NET ENERGY SAVINGS 35.60 MBTU/YR

NET DOLLAR SAVINGS \$625.76

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6784

LAMP USE:

HOURS/DAY 4

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
0 LAMPS @	52 WATTS =	0 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
2 LAMPS @	90 WATTS =	180 WATTS
0 LAMPS @	100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 180

BASELINE ENERGY CONSUMPTION 0.64 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
0 LAMPS @	13 WATTS =	0 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
2 LAMPS @	26 WATTS =	52 WATTS

TOTAL REPLACEMENT WATTS 52

REPLACEMENT ENERGY CONSUMPTION 0.18 MBTU

NET ENERGY SAVINGS 0.45 MBTU/YR

NET DOLLAR SAVINGS \$2.81



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 15:04:51

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6784

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N  
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-139

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

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DETAILED ESTIMATE	DETAIL PAGE
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AA. ELECTRICAL.....	1

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6784  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 15:04:51

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAxIAL FL LAMP	*** UNIT COSTS: ***			1.25	41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS	2.00 EA EELEA			3	83	0	62	3	148
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	22.00 EA EELEB			13	427	2	2,992	150	3,570
TOTAL DIVISION 16 ELECTRICAL					15	510	2	3,054	153	3,718
TOTAL FACILITY AA. ELECTRICAL					15	510	2	3,054	153	3,718
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					15	510	2	3,054	153	3,718
TOTAL BASE BID					15	510	2	3,054	153	3,718
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					15	510	2	3,054	153	3,718

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-141

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-142

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	3,718	372	0	307	110	0	4,507	4506.56
BID ITEM TOTAL		1.00 EA	3,718	372	0	307	110	0	4,507	4506.56
TOTAL BASE BID			3,718	372	0	307	110	0	4,507	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,718	372	0	307	110	0	4,507	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-143

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,507		4,507	4506.60
	TOTAL CURRENT CONTRACT COST		4,507	0	4,507	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		4,507	0	4,507	
	Government-Furnished Property		0		0	
	SUBTOTAL		4,507	0	4,507	
	Contingencies	10.0%	451	0	451	
	SUBTOTAL		4,957	0	4,957	
	SIOH (S&A)	5.5%	273	0	273	
	CURRENT WORKING ESTIMATE		5,230	0	5,230	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-144

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	15	510	2	3,207	3,718	100.0%	0	3,718
	TOTAL DIRECT				15	510	2	3,207	3,718	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-145

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,718	372	10.0%	0.0	307	7.5%	2.5%	0.0%	4,507	100.0%	4506.55
	TOTAL OVERHEAD & PROFIT			372	10.0%		307	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-146



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	510	2	3,054	153	3,718
TOTAL DIRECT	15	510	2	3,054	153	3,718

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-147

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	510	2	3,054	153	3,718
TOTAL DIRECT	15	510	2	3,054	153	3,718

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-148

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSHP	OWNS	OVTH	OWNRSHP	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS										1	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6784

TIME 15:04:51

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	16	510
TOTAL PROJECT MANHOURS								16	510

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6784E6

3-150

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6789

BUILDING USE:

HOURS/DAY 12  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
4 2 LAMP @ 96 W/FIXT = 384 WATTS  
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
2 4 LAMP @ 192 W/FIXT = 384 WATTS  
23 4 LAMP @ 151.2 W/FIXT = 3477 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
4 1 LAMP W/ REFLECTORS 37 W/FIXT = 148 WATTS  
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
25 2 LAMP W/ REFLECTORS 58 W/FIXT = 1450 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW

4.25

TOTAL REPLACEMENT KW

1.60

BASELINE ENERGY CONSUMPTION 45.19 MBTU

REPLACEMENT ENERGY CONSUMPTION

17.01 MBTU

NET ENERGY SAVINGS 28.18 MBTU/YR

NET DOLLAR SAVINGS

\$548.89

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6789

LAMP USE:

HOURS/DAY 9

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
0 LAMPS @	52 WATTS =	0 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
2 LAMPS @	90 WATTS =	180 WATTS
1 LAMPS @	100 WATTS =	100 WATTS

TOTAL EXISTING WATTS 280

BASELINE ENERGY CONSUMPTION 2.24 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
0 LAMPS @	13 WATTS =	0 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
3 LAMPS @	26 WATTS =	78 WATTS

TOTAL REPLACEMENT WATTS 78

REPLACEMENT ENERGY CONSUMPTION 0.62 MBTU

NET ENERGY SAVINGS 1.61 MBTU/YR

NET DOLLAR SAVINGS \$38.55

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 15:11:41

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6789

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-153

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

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DETAILED ESTIMATE	DETAIL PAGE
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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6789  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 15:11:41

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
-----										
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP	*** UNIT COSTS: ***			1.25	41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS	3.00 EA EELEA		4	124	0		93	5	221
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	4.00 EA EELEB		2	71	0		488	24	584
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	25.00 EA EELEB		15	485	2		3,400	170	4,057
TOTAL DIVISION 16 ELECTRICAL					21	681	2	3,981	199	4,863
TOTAL FACILITY AA. ELECTRICAL					21	681	2	3,981	199	4,863
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					21	681	2	3,981	199	4,863
TOTAL BASE BID					21	681	2	3,981	199	4,863
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					21	681	2	3,981	199	4,863

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-155

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-156

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	4,863	486	0	401	144	0	5,894	5894.05
BID ITEM TOTAL		1.00 EA	4,863	486	0	401	144	0	5,894	5894.05
TOTAL BASE BID			4,863	486	0	401	144	0	5,894	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,863	486	0	401	144	0	5,894	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-157

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	5,894		5,894	5894.10
	TOTAL CURRENT CONTRACT COST		5,894	0	5,894	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		5,894	0	5,894	
	Government-Furnished Property		0		0	
	SUBTOTAL		5,894	0	5,894	
	Contingencies	10.0%	589	0	589	
	SUBTOTAL		6,484	0	6,484	
	SIOH (S&A)	5.5%	357	0	357	
	CURRENT WORKING ESTIMATE		6,840	0	6,840	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-158

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	21	681	2	4,180		4,863	100.0%	0	4,863
	TOTAL DIRECT				21	681	2	4,180		4,863	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-159

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,863	486	10.0%	0.0		401	7.5%	2.5%	0.0%		5,894	100.0%		5894.05
	TOTAL OVERHEAD & PROFIT			486	10.0%			401	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-160

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	21	681	2	3,981	199	4,863
TOTAL DIRECT	21	681	2	3,981	199	4,863

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-161

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	21	681	2	3,981	199	4,863
TOTAL DIRECT	21	681	2	3,981	199	4,863

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6789E6

3-162



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6789

TIME 15:11:41

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	**** TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	21	680
TOTAL PROJECT MANHOURS								21	680

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6790

BUILDING USE:

HOURS/DAY 8  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
38 2 LAMP @ 96 W/FIXT = 3648 WATTS  
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
0 4 LAMP @ 192 W/FIXT = 0 WATTS  
8 4 LAMP @ 151.2 W/FIXT = 1209 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
38 1 LAMP W/ REFLECTORS 37 W/FIXT = 1406 WATTS  
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
8 2 LAMP W/ REFLECTORS 58 W/FIXT = 464 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.86

TOTAL REPLACEMENT KW 1.87

BASELINE ENERGY CONSUMPTION 34.47 MBTU

REPLACEMENT ENERGY CONSUMPTION 13.27 MBTU

NET ENERGY SAVINGS 21.20 MBTU/YR

NET DOLLAR SAVINGS \$553.70

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6790

LAMP USE:

HOURS/DAY 8

DAYS/WEEK 5

PEAK USE 1 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
3 LAMPS @ 52 WATTS =	156 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
<b>TOTAL EXISTING WATTS</b>	<b>156</b>

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
3 LAMPS @ 13 WATTS =	39 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
<b>TOTAL REPLACEMENT WATTS</b>	<b>39</b>

BASELINE ENERGY CONSUMPTION 1.11 MBTU

REPLACEMENT ENERGY CONSUMPTION 0.28 MBTU

NET ENERGY SAVINGS 0.83 MBTU/YR

NET DOLLAR SAVINGS \$21.68

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 15:18:24

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6790

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-167

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6790  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 15:18:24

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	3.00	EA EELEA	4		124	0	83	4	211
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54		17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	38.00	EA EELEB	21		678	3	4,636	232	5,548
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59		19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	8.00	EA EELEB	5		155	1	1,088	54	1,298
TOTAL DIVISION 16 ELECTRICAL					29	957	3	5,807	290	7,058
TOTAL FACILITY AA. ELECTRICAL					29	957	3	5,807	290	7,058
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					29	957	3	5,807	290	7,058
TOTAL BASE BID					29	957	3	5,807	290	7,058
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					29	957	3	5,807	290	7,058

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-168

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-169

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	7,058	706	0	582	209	0	8,555	8554.98
BID ITEM TOTAL		1.00 EA	7,058	706	0	582	209	0	8,555	8554.98
TOTAL BASE BID			7,058	706	0	582	209	0	8,555	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			7,058	706	0	582	209	0	8,555	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-170



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	8,555		8,555	8555.00
	TOTAL CURRENT CONTRACT COST			8,555	0	8,555	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			8,555	0	8,555	
	Government-Furnished Property			0		0	
	SUBTOTAL			8,555	0	8,555	
	Contingencies	10.0%		856	0	856	
	SUBTOTAL			9,411	0	9,411	
	SIOH (S&A)	5.5%		518	0	518	
	CURRENT WORKING ESTIMATE			9,928	0	9,928	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-171

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	** SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	29	957	3	6,098		7,058	100.0%	0	7,058
	TOTAL DIRECT				29	957	3	6,098		7,058	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-172

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		7,058	706	10.0%	0.0	582	7.5%	2.5%	0.0%	8,555	100.0%	8554.98
	TOTAL OVERHEAD & PROFIT			706	10.0%		582	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-173

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	29	957	3	5,807	290	7,058
TOTAL DIRECT	29	957	3	5,807	290	7,058

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-174

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	29	957	3	5,807	290	7,058
TOTAL DIRECT	29	957	3	5,807	290	7,058

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6790E6

3-175

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR		ADJUSTD		BOOK OP		-- HRLY		--- UPB		**** TOTAL ****	
EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST	
-----													
EH120	SMALL TOOLS								1.40	1.40	2	3	
TOTAL PROJECT EQUIPMENT HOURS											2	3	

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6790

TIME 15:18:24

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	29	957
TOTAL PROJECT MANHOURS								29	957

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6901

BUILDING USE:

HOURS/DAY 11  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
0 2 LAMP @ 96 W/FIXT = 0 WATTS  
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
17 4 LAMP @ 192 W/FIXT = 3264 WATTS  
59 4 LAMP @ 151.2 W/FIXT = 8920 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 12.18

BASELINE ENERGY CONSUMPTION 118.9 MBTU

NET ENERGY SAVINGS 75.89 MBTU/YR

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
0 1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
76 2 LAMP W/ REFLECTORS 58 W/FIXT = 4408 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 4.41

REPLACEMENT ENERGY CONSUMPTION 43.01 MBTU

NET DOLLAR SAVINGS \$1,569.52



# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS  
30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6901

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
4 LAMPS @	52 WATTS =	208 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
2 LAMPS @	90 WATTS =	180 WATTS
0 LAMPS @	100 WATTS =	0 WATTS
TOTAL EXISTING WATTS		388

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
4 LAMPS @	13 WATTS =	52 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
2 LAMPS @	26 WATTS =	52 WATTS
TOTAL REPLACEMENT WATTS		104

BASELINE ENERGY CONSUMPTION 1.72 MBTU

REPLACEMENT ENERGY CONSUMPTION 0.46 MBTU

NET ENERGY SAVINGS 1.25 MBTU/YR

NET DOLLAR SAVINGS \$7.80

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 15:42:09

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6901

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-180

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6901  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 15:42:09

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
-----										
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAxIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	4.00	EA EELEA	5		165	0	111	6	282
CD=3 EL 6107	SURF SQ W/1 26W BIAxIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS	2.00	EA EELEA	3		83	0	62	3	148
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59		19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	76.00	EA EELEB	45		1,476	6	10,336	517	12,334
TOTAL DIVISION 16 ELECTRICAL					52	1,723	6	10,509	525	12,764
TOTAL FACILITY AA. ELECTRICAL					52	1,723	6	10,509	525	12,764
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					52	1,723	6	10,509	525	12,764
TOTAL BASE BID					52	1,723	6	10,509	525	12,764
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					52	1,723	6	10,509	525	12,764

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-182

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	12,764	10.0% 1,276	0.0% 0	7.5% 1,053	2.5% 377	0.0% 0	15,470	15470.46
BID ITEM TOTAL		1.00 EA	12,764	1,276	0	1,053	377	0	15,470	15470.46
TOTAL BASE BID			12,764	1,276	0	1,053	377	0	15,470	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			12,764	1,276	0	1,053	377	0	15,470	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-184

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	15,471		15,471	15470.50
	TOTAL CURRENT CONTRACT COST			15,471	0	15,471	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			15,471	0	15,471	
	Government-Furnished Property			0		0	
	SUBTOTAL			15,471	0	15,471	
	Contingencies	10.0%		1,547	0	1,547	
	SUBTOTAL			17,018	0	17,018	
	SIOH (S&A)	5.5%		936	0	936	
	CURRENT WORKING ESTIMATE			17,954	0	17,954	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-185

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	52	1,723	6	11,035		12,764 100.0%	0	12,764
	TOTAL DIRECT				52	1,723	6	11,035		12,764 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-186



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		12,764	1,276	10.0%	0.0	1,053	7.5%	2.5%	0.0%	15,470	100.0%	15470.45
	TOTAL OVERHEAD & PROFIT			1,276	10.0%		1,053	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-187

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	52	1,723	6	10,509	525	12,764
TOTAL DIRECT	52	1,723	6	10,509	525	12,764

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-188

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

SYSTEMS SUMMARY

SUMMARY PAGE 7

-----						***** TOTAL * -----
ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	DIRECT
-----						-----
11 INTERIOR ELECTRICAL	52	1,723	6	10,509	525	12,764
TOTAL DIRECT	52	1,723	6	10,509	525	12,764

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6901E6

3-189

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS									1.40	1.40	4	6
TOTAL PROJECT EQUIPMENT HOURS											4	6

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6901

TIME 15:42:09

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TKS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	52	1,723
TOTAL PROJECT MANHOURS								52	1,723

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6903

BUILDING USE:

HOURS/DAY 8.5

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 4 2 LAMP @ 96 W/FIXT = 384 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 17 4 LAMP @ 192 W/FIXT = 3264 WATTS  
 10 4 LAMP @ 151.2 W/FIXT = 1512 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.16

BASELINE ENERGY CONSUMPTION 98.90 MBTU

NET ENERGY SAVINGS 25.98 MBTU/YR

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 4 1 LAMP W/ REFLECTORS 37 W/FIXT = 148 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 27 2 LAMP W/ REFLECTORS 58 W/FIXT = 1566 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.71

REPLACEMENT ENERGY CONSUMPTION 12.92 MBTU

NET DOLLAR SAVINGS \$648.12

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 2 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6903

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
10 LAMPS @	52 WATTS =	520 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
0 LAMPS @	100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 520

BASELINE ENERGY CONSUMPTION 2.31 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
10 LAMPS @	13 WATTS =	130 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
0 LAMPS @	26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 130

REPLACEMENT ENERGY CONSUMPTION 0.58 MBTU

NET ENERGY SAVINGS 1.72 MBTU/YR

NET DOLLAR SAVINGS \$10.72

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 15:55:43

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6903

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-194



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

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DETAILED ESTIMATE

DETAIL PAGE

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6903  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 15:55:43

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25	41.26	0.00	27.80	1.39	70.45	
WC=1100	WHITE ACRYLIC LENS	10.00	EA EELEA	13	413	0	278	14	705	
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54	17.84	0.07	122.00	6.10	146.01	
WC=1100	REFLECTOR	4.00	EA EELEB	2	71	0	488	24	584	
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29	
WC=1100	REFLECTOR	27.00	EA EELEB	16	524	2	3,672	184	4,382	
TOTAL DIVISION 16 ELECTRICAL					31	1,008	2	4,438	222	5,671
TOTAL FACILITY AA. ELECTRICAL					31	1,008	2	4,438	222	5,671
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					31	1,008	2	4,438	222	5,671
TOTAL BASE BID					31	1,008	2	4,438	222	5,671
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					31	1,008	2	4,438	222	5,671

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-196

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,671	10.0% 567	0.0% 0	7.5% 468	2.5% 168	0.0% 0	6,873 6873.01
BID ITEM TOTAL		1.00 EA	5,671	567	0	468	168	0	6,873 6873.01
TOTAL BASE BID			5,671	567	0	468	168	0	6,873
TOTAL ADDITIVE			0	0	0	0	0	0	0
TOTAL INCL ADD			5,671	567	0	468	168	0	6,873

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-198

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,873		6,873	6873.00
	TOTAL CURRENT CONTRACT COST			6,873	0	6,873	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			6,873	0	6,873	
	Government-Furnished Property			0		0	
	SUBTOTAL			6,873	0	6,873	
	Contingencies	10.0%		687	0	687	
	SUBTOTAL			7,560	0	7,560	
	SIOH (S&A)	5.5%		416	0	416	
	CURRENT WORKING ESTIMATE			7,976	0	7,976	

Estimated Construction Time 365 Days

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	31	1,008	2	4,660		5,671	100.0%	0	5,671
	TOTAL DIRECT				31	1,008	2	4,660		5,671	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-200

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,671	567	10.0%	0.0	468	7.5%	2.5%	0.0%	6,873	100.0%	6873.00
	TOTAL OVERHEAD & PROFIT			567	10.0%		468	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-201

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	31	1,008	2	4,438	222	5,671
TOTAL DIRECT	31	1,008	2	4,438	222	5,671

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-202



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	31	1,008	2	4,438	222	5,671
TOTAL DIRECT	31	1,008	2	4,438	222	5,671

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6903E6

3-203

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS								1.40	1.40	2	2	
TOTAL PROJECT EQUIPMENT HOURS										2	2	

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6903

TIME 15:55:43

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY -- RATE	UPB RATE	**** TOTAL **** HOURS	COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	31	1,008
TOTAL PROJECT MANHOURS								31	1,008

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 3

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6904

BUILDING USE:

HOURS/DAY 13

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0 2 LAMP @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 0 4 LAMP @ 192 W/FIXT = 0 WATTS  
 20 4 LAMP @ 151.2 W/FIXT = 3024 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 0 1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 20 2 LAMP W/ REFLECTORS 58 W/FIXT = 1160 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.02

TOTAL REPLACEMENT KW 1.16

BASELINE ENERGY CONSUMPTION 34.87 MBTU

REPLACEMENT ENERGY CONSUMPTION 13.38 MBTU

NET ENERGY SAVINGS 21.50 MBTU/YR

NET DOLLAR SAVINGS \$396.68

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 2 OF 3

30 SEPTEMBER 1993

## OVERLIT AREA FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6904  
AREA: CONFERENCE ROOM AND OFFICE

AREA USE: \_\_\_\_\_  
HOURS/DAY: 13  
DAYS/WEEK: 5

ELECTRIC COSTS:  
ENERGY CHARGE: \$0.0211 PER KWH  
DEMAND CHARGE: \$11.78 PER KW

### EXISTING FIXTURE DATA

4 FOOT

1 LAMP @	48 W/FIXT =	0 WATTS
1 LAMP @	37.8 W/FIXT =	0 WATTS
2 LAMP @	96 W/FIXT =	0 WATTS
2 LAMP @	75.6 W/FIXT =	0 WATTS
3 LAMP @	144 W/FIXT =	0 WATTS
3 LAMP @	113.4 W/FIXT =	0 WATTS
4 LAMP @	192 W/FIXT =	0 WATTS
5.4 LAMP @	151.2 W/FIXT =	756 WATTS

2 FOOT

1 LAMP @	31 W/FIXT =	0 WATTS
4 LAMP @	88 W/FIXT =	0 WATTS
2 LAMP U @	96 W/FIXT =	0 WATTS
2 LAMP U @	75.6 W/FIXT =	0 WATTS

8 FOOT

2 LAMP @	180 W/FIXT =	0 WATTS
2 LAMP @	168 W/FIXT =	0 WATTS

### REPLACEMENT FIXTURE DATA

4 FOOT

0.1 LAMP @	37 W/FIXT =	0 WATTS
0.1 LAMP @	37 W/FIXT =	0 WATTS
0.2 LAMP @	58 W/FIXT =	0 WATTS
5.2 LAMP @	58 W/FIXT =	290 WATTS

2 FOOT

0.1 LAMP @	24 W/FIXT =	0 WATTS
0.2 LAMP @	41 W/FIXT =	0 WATTS
0.2 LAMP U @	58 W/FIXT =	0 WATTS

8 FOOT

0.1 LAMP @	58 W/FIXT =	0 WATTS
------------	-------------	---------

TOTAL EXISTING KW 0.756  
BASELINE ENERGY CONSUMPTION 8.72 MBTU

TOTAL REPLACEMENT KW 0.29  
REPLACEMENT ENERGY CONSUMPTION 3.34 MBTU

NET ENERGY SAVINGS 5.37 MBTU/YR

NET DOLLAR SAVINGS \$99.17

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 3 OF 3

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6904

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
1 LAMPS @ 52 WATTS =	52 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 52

BASELINE ENERGY CONSUMPTION 0.23 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
1 LAMPS @ 13 WATTS =	13 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 13

REPLACEMENT ENERGY CONSUMPTION 0.06 MBTU

NET ENERGY SAVINGS 0.17 MBTU/YR

NET DOLLAR SAVINGS \$1.07

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 16:18:42

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6904

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-209

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904  
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 16:18:42

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)									
CD=3 EL 6105 SURF SQ W/1 13W BIAXIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	27.80	1.39	70.45
WC=1100 WHITE ACRYLIC LENS 1.00 EA EELEA	1				41	0	28	1	70
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 20.00 EA EELEB	12				388	2	2,720	136	3,246
CD=3 EL 7008 4 FT 2 LAMP PARABOLIC LOUVRE *** UNIT COSTS: ***	0.50				16.51	0.06	120.00	6.00	142.57
WC=1100 5.00 EA EELEB	3				83	0	600	30	713
TOTAL DIVISION 16 ELECTRICAL	16				512	2	3,348	167	4,029
TOTAL FACILITY AA. ELECTRICAL	16				512	2	3,348	167	4,029
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	16				512	2	3,348	167	4,029
TOTAL BASE BID	16				512	2	3,348	167	4,029
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	16				512	2	3,348	167	4,029

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-211

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OPC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,029	10.0% 403	0.0% 0	7.5% 332	2.5% 119	0.0% 0	4,884	4883.61
BID ITEM TOTAL		1.00 EA	4,029	403	0	332	119	0	4,884	4883.61
TOTAL BASE BID			4,029	403	0	332	119	0	4,884	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,029	403	0	332	119	0	4,884	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-213

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,884		4,884	4883.60
TOTAL CURRENT CONTRACT COST			4,884	0	4,884	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%	0	0	0	
ESCALATED CONTRACT COST			4,884	0	4,884	
Government-Furnished Property			0		0	
SUBTOTAL			4,884	0	4,884	
Contingencies		10.0%	488	0	488	
SUBTOTAL			5,372	0	5,372	
SIOH (S&A)		5.5%	295	0	295	
CURRENT WORKING ESTIMATE			5,667	0	5,667	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-214

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	16	512	2	3,515		4,029 100.0%	0	4,029
	TOTAL DIRECT				16	512	2	3,515		4,029 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-215

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,029	403	10.0%	0.0		332	7.5%	2.5%	0.0%		4,884	100.0%		4883.61
	TOTAL OVERHEAD & PROFIT			403	10.0%			332	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-216

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS H-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	16	512	2	3,348	167	4,029
TOTAL DIRECT	16	512	2	3,348	167	4,029

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-217

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	16	512	2	3,348	167	4,029
TOTAL DIRECT	16	512	2	3,348	167	4,029

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-218



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	HRLY	UPB	RATE	HOURS	TOTAL	COST
EMI20 SMALL TOOLS									1.40		1.40		1	1	2
TOTAL PROJECT EQUIPMENT HOURS													1	1	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6904

TIME 16:18:42

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT	DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC	ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	16	512
									16	512
TOTAL PROJECT MANHOURS										

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6904E6

3-220

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6905

BUILDING USE:

HOURS/DAY 11

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0.2 LAMP @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0.3 LAMP @ 144 W/FIXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 25.4 LAMP @ 192 W/FIXT = 4800 WATTS  
 0.4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 25.2 LAMP W/ REFLECTORS 58 W/FIXT = 1450 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
 0.4 LAMP @ 88 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 98 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 75.5 W/FIXT = 0 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.80

TOTAL REPLACEMENT KW 1.45

BASELINE ENERGY CONSUMPTION 46.83 MBTU

REPLACEMENT ENERGY CONSUMPTION 14.15 MBTU

NET ENERGY SAVINGS 32.69 MBTU/YR

NET DOLLAR SAVINGS \$676.10

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 16:09:47

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6905

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-222

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6905  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 16:09:47

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL

QUANTITY UOM CREW MANHR LABOR EQUIPMENT MATERIAL SALESTX DIRECT \$

16500 LIGHTING

16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST

CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	25.00 EA EELEB	15	485	2	3,400	170	4,057

TOTAL DIVISION 16 ELECTRICAL

15 485 2 3,400 170 4,057

TOTAL FACILITY AA. ELECTRICAL

15 485 2 3,400 170 4,057

TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE

15 485 2 3,400 170 4,057

TOTAL BASE BID

15 485 2 3,400 170 4,057

TOTAL ADDITIVE

0 0 0 0 0 0

TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY

15 485 2 3,400 170 4,057

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-224

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-225

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,057	10.0% 406	0.0% 0	7.5% 335	2.5% 120	0.0% 0	4,918	4917.75
BID ITEM TOTAL		1.00 EA	4,057	406	0	335	120	0	4,918	4917.75
TOTAL BASE BID			4,057	406	0	335	120	0	4,918	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,057	406	0	335	120	0	4,918	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-226



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,918		4,918	4917.70
TOTAL CURRENT CONTRACT COST				4,918	0	4,918	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				4,918	0	4,918	
Government-Furnished Property				0		0	
SUBTOTAL				4,918	0	4,918	
Contingencies		10.0%		492	0	492	
SUBTOTAL				5,409	0	5,409	
SIOH (S&A)		5.5%		298	0	298	
CURRENT WORKING ESTIMATE				5,707	0	5,707	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-227

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	15	485	2	3,570		4,057	100.0%	0	4,057
	TOTAL DIRECT				15	485	2	3,570		4,057	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-228

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,057	406	10.0%	0.0	335	7.5%	2.5%	0.0%	4,918	100.0%	4917.75
	TOTAL OVERHEAD & PROFIT			406	10.0%		335	7.5%					

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	485	2	3,400	170	4,057
TOTAL DIRECT	15	485	2	3,400	170	4,057

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-230

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	485	2	3,400	170	4,057
TOTAL DIRECT	15	485	2	3,400	170	4,057

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6905E6

3-231

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTH	OWNRSH	EXPENSE	HRLY	UPB	HOURS	TOTAL
									RATE	RATE		COST
EMI20 SMALL TOOLS									1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS											1	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6905

TIME 16:09:47

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	15	485
TOTAL PROJECT MANHOURS								15	485

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6906

BUILDING USE:

HOURS/DAY 8

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 0.2 LAMP @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0.3 LAMP @ 144 W/FIXT = 0 WATTS  
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 28.4 LAMP @ 192 W/FIXT = 5376 WATTS  
 0.4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
 0.4 LAMP @ 88 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 28.2 LAMP W/ REFLECTORS 58 W/FIXT = 1624 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.38

TOTAL REPLACEMENT KW 1.62

BASELINE ENERGY CONSUMPTION 38.15 MBTU

REPLACEMENT ENERGY CONSUMPTION 11.53 MBTU

NET ENERGY SAVINGS 26.63 MBTU/YR

NET DOLLAR SAVINGS \$695.36



# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6906

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
3 LAMPS @	52 WATTS =	156 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
0 LAMPS @	100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 156

BASELINE ENERGY CONSUMPTION 0.69 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
3 LAMPS @	13 WATTS =	39 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
0 LAMPS @	26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 39

REPLACEMENT ENERGY CONSUMPTION 0.17 MBTU

NET ENERGY SAVINGS 0.51 MBTU/YR

NET DOLLAR SAVINGS \$9.22

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 16:25:38

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6906

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-236

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

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DETAILED ESTIMATE	DETAIL PAGE
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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906  
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 16:25:38

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	3.00	EA EELEA	4		124	0	83	4	211
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59		19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	28.00	EA EELEB	16		544	2	3,808	190	4,544
TOTAL DIVISION 16 ELECTRICAL					20	667	2	3,891	195	4,756
TOTAL FACILITY AA. ELECTRICAL					20	667	2	3,891	195	4,756
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					20	667	2	3,891	195	4,756
TOTAL BASE BID					20	667	2	3,891	195	4,756
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					20	667	2	3,891	195	4,756

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-238

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,756	10.0% 476	0.0% 0	7.5% 392	2.5% 141	0.0% 0	5,764	5764.06
BID ITEM TOTAL		1.00 EA	4,756	476	0	392	141	0	5,764	5764.06
TOTAL BASE BID			4,756	476	0	392	141	0	5,764	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,756	476	0	392	141	0	5,764	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-240

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	5,764		5,764	5764.10
	TOTAL CURRENT CONTRACT COST			5,764	0	5,764	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			5,764	0	5,764	
	Government-Furnished Property			0		0	
	SUBTOTAL			5,764	0	5,764	
	Contingencies	10.0%		576	0	576	
	SUBTOTAL			6,341	0	6,341	
	SIOH (S&A)	5.5%		349	0	349	
	CURRENT WORKING ESTIMATE			6,689	0	6,689	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6  
3-241

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	20	667	2	4,086	4,756 100.0%	0	4,756
	TOTAL DIRECT				20	667	2	4,086	4,756 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6  
3-242



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,756	476	10.0%	0.0	392	7.5%	2.5%	0.0%	5,764	100.0%	5764.06
	TOTAL OVERHEAD & PROFIT			476	10.0%		392	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-243

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	20	667	2	3,891	195	4,756
TOTAL DIRECT	20	667	2	3,891	195	4,756

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-244

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	20	667	2	3,891	195	4,756
TOTAL DIRECT	20	667	2	3,891	195	4,756

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6

3-245

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6906

TIME 16:25:38

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC	ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	20	668
									20	668
TOTAL PROJECT MANHOURS										

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6906E6  
3-247

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6907

BUILDING USE:

HOURS/DAY 12  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
1 2 LAMP @ 96 W/FIXT = 96 WATTS  
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
0 4 LAMP @ 192 W/FIXT = 0 WATTS  
21 4 LAMP @ 151.2 W/FIXT = 3175. WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
1 1 LAMP W/ 37 W/FIXT = 37 WATTS  
REFLECTORS  
0 2 LAMP W/ 58 W/FIXT = 0 WATTS  
REFLECTORS  
21 2 LAMP W/ 58 W/FIXT = 1218 WATTS  
REFLECTORS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ 41 W/FIXT = 0 WATTS  
REFLECTORS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ 58 W/FIXT = 0 WATTS  
REFLECTORS

TOTAL EXISTING KW 3.27

TOTAL REPLACEMENT KW 1.26

BASELINE ENERGY CONSUMPTION 34.82 MBTU

REPLACEMENT ENERGY CONSUMPTION 19.96 MBTU

NET ENERGY SAVINGS 21.46 MBTU/YR

NET DOLLAR SAVINGS \$417.99

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 16:32:17

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6907

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6  
3-249

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

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DETAILED ESTIMATE

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6907  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 16:32:17

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL				QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING												
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST												
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***		0.54				17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	1.00 EA EELEB		1				18	0	122	6	146
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***		0.59				19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	21.00 EA EELEB		12				408	2	2,856	143	3,408
TOTAL DIVISION 16 ELECTRICAL				13				426	2	2,978	149	3,554
TOTAL FACILITY AA. ELECTRICAL				13				426	2	2,978	149	3,554
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				13				426	2	2,978	149	3,554
TOTAL BASE BID				13				426	2	2,978	149	3,554
TOTAL ADDITIVE				0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				13				426	2	2,978	149	3,554

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-251

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,554	10.0% 355	0.0% 0	7.5% 293	2.5% 105	0.0% 0	4,308	4307.88
BID ITEM TOTAL		1.00 EA	3,554	355	0	293	105	0	4,308	4307.88
TOTAL BASE BID			3,554	355	0	293	105	0	4,308	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,554	355	0	293	105	0	4,308	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-253

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,308		4,308	4307.90
	TOTAL CURRENT CONTRACT COST		4,308	0	4,308	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		4,308	0	4,308	
	Government-Furnished Property		0		0	
	SUBTOTAL		4,308	0	4,308	
	Contingencies	10.0%	431	0	431	
	SUBTOTAL		4,739	0	4,739	
	SIOH (S&A)	5.5%	261	0	261	
	CURRENT WORKING ESTIMATE		4,999	0	4,999	
	Estimated Construction Time	365 Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-254

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	13	426	2	3,127		3,554	100.0%	0	3,554
	TOTAL DIRECT				13	426	2	3,127		3,554	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-255

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,554		355	10.0%	0.0		293	7.5%	2.5%	0.0%		4,308	100.0%	4307.88
	TOTAL OVERHEAD & PROFIT				355	10.0%			293	7.5%						

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6  
3-256

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	13	426	2	2,978	149	3,554
TOTAL DIRECT	13	426	2	2,978	149	3,554

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-257

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	13	426	2	2,978	149	3,554
TOTAL DIRECT	13	426	2	2,978	149	3,554

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6907E6

3-258



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS										1	2

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6907

TIME 16:32:17

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	13	426
TOTAL PROJECT MANHOURS								13	426

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6908

BUILDING USE:

HOURS/DAY 13

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 17 2 LAMP @ 96 W/FIXT = 1632 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
 7 4 LAMP @ 192 W/FIXT = 1344 WATTS  
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 17 1 LAMP W/ REFLECTORS 629 WATTS  
 0 2 LAMP W/ REFLECTORS 0 WATTS  
 7 2 LAMP W/ REFLECTORS 406 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 2.98

TOTAL REPLACEMENT KW 1.04

BASELINE ENERGY CONSUMPTION 34.32 MBTU

REPLACEMENT ENERGY CONSUMPTION 11.94 MBTU

NET ENERGY SAVINGS 22.38 MBTU/YR

NET DOLLAR SAVINGS \$413.07

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6908

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
2 LAMPS @ 52 WATTS =	104 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
<b>TOTAL EXISTING WATTS</b>	<b>104</b>

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
2 LAMPS @ 13 WATTS =	26 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
<b>TOTAL REPLACEMENT WATTS</b>	<b>26</b>

TOTAL EXISTING WATTS 104

TOTAL REPLACEMENT WATTS 26

BASELINE ENERGY CONSUMPTION 0.46 MBTU

REPLACEMENT ENERGY CONSUMPTION 0.12 MBTU

NET ENERGY SAVINGS 0.34 MBTU/YR

NET DOLLAR SAVINGS \$2.14

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 16:44:10

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6908

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

M - C A C E S   E D I T I O N  
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6  
3-263

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

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DETAILED ESTIMATE

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Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6908  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 16:44:10

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAxIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	2.00	EA EELEA	3		83	0	56	3	141
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54		17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	17.00	EA EELEB	9		303	1	2,074	104	2,482
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59		19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	7.00	EA EELEB	4		136	1	952	48	1,136
TOTAL DIVISION 16 ELECTRICAL					16	522	2	3,082	154	3,759
TOTAL FACILITY AA. ELECTRICAL					16	522	2	3,082	154	3,759
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					16	522	2	3,082	154	3,759
TOTAL BASE BID					16	522	2	3,082	154	3,759
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					16	522	2	3,082	154	3,759

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6

3-265

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.



Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,759	10.0% 376	0.0% 0	7.5% 310	2.5% 111	0.0% 0	4,556	4556.36
<hr/>										
BID ITEM TOTAL		1.00 EA	3,759	376	0	310	111	0	4,556	4556.36
<hr/>										
TOTAL BASE BID			3,759	376	0	310	111	0	4,556	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
<hr/>										
TOTAL INCL ADD			3,759	376	0	310	111	0	4,556	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6

3-267

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,556		4,556	4556.40
	TOTAL CURRENT CONTRACT COST			4,556	0	4,556	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			4,556	0	4,556	
	Government-Furnished Property			0		0	
	SUBTOTAL			4,556	0	4,556	
	Contingencies	10.0%		456	0	456	
	SUBTOTAL			5,012	0	5,012	
	SIOH (S&A)	5.5%		276	0	276	
	CURRENT WORKING ESTIMATE			5,288	0	5,288	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6

3-268

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	16	522	2	3,236		3,759	100.0%	0	3,759
	TOTAL DIRECT				16	522	2	3,236		3,759	100.0%		

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,759		376	10.0%	0.0		310	7.5%	2.5%	0.0%		4,556	100.0%	4556.36
	TOTAL OVERHEAD & PROFIT				376	10.0%			310	7.5%						

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6

3-270

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	16	522	2	3,082	154	3,759
TOTAL DIRECT	16	522	2	3,082	154	3,759

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6

3-271

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	16	522	2	3,082	154	3,759
TOTAL DIRECT	16	522	2	3,082	154	3,759

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6908E6  
3-272

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20	SMALL TOOLS								1.40	1.40	1	2
											1	2
TOTAL PROJECT EQUIPMENT HOURS												

Thu 09 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6908

TIME 16:44:10

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	**** TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	16	522
TOTAL PROJECT MANHOURS								16	522

\* \* \* END OF SUMMARY REPORT \* \* \*



# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6913

BUILDING USE:

HOURS/DAY 12  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
1 2 LAMP @ 96 W/FIXT = 96 WATTS  
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0 3 LAMP @ 144 W/FIXT = 0 WATTS  
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS  
6 4 LAMP @ 192 W/FIXT = 1152 WATTS  
14 4 LAMP @ 151.2 W/FIXT = 2116 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
0 4 LAMP @ 88 W/FIXT = 0 WATTS  
0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
1 1 LAMP W/ REFLECTORS 37 W/FIXT = 37 WATTS  
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
20 2 LAMP W/ REFLECTORS 58 W/FIXT = 1160 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.36

TOTAL REPLACEMENT KW 1.20

BASELINE ENERGY CONSUMPTION 35.81 MBTU

REPLACEMENT ENERGY CONSUMPTION 12.74 MBTU

NET ENERGY SAVINGS 23.08 MBTU/YR

NET DOLLAR SAVINGS \$449.42

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6913

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1--YES, 2--NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
0 LAMPS @ 52 WATTS =	0 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
1 LAMPS @ 100 WATTS =	100 WATTS

TOTAL EXISTING WATTS 100

BASELINE ENERGY CONSUMPTION 0.44 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
0 LAMPS @ 13 WATTS =	0 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
1 LAMPS @ 28 WATTS =	28 WATTS

TOTAL REPLACEMENT WATTS 26

REPLACEMENT ENERGY CONSUMPTION 0.12 MBTU

NET ENERGY SAVINGS 0.32 MBTU/YR

NET DOLLAR SAVINGS \$2.03

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 07:29:39

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6913

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6  
3-277

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6913  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 07:29:39

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP	*** UNIT COSTS: ***			1.25	41.26	0.00	31.00	1.55	73.81
WC=1100	WHITE ACRYLIC LENS	1.00 EA EELEA		1	41	0	31	2		74
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	1.00 EA EELEB		1	18	0	122	6		146
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	20.00 EA EELEB		12	388	2	2,720	136		3,246
TOTAL DIVISION 16 ELECTRICAL					14	447	2	2,873	144	3,466
TOTAL FACILITY AA. ELECTRICAL					14	447	2	2,873	144	3,466
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					14	447	2	2,873	144	3,466
TOTAL BASE BID					14	447	2	2,873	144	3,466
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					14	447	2	2,873	144	3,466

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6  
 3-279

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

SUMMARY PAGE 1

PROJECT NOTES

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6  
3-280

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,466	10.0% 347	0.0% 0	7.5% 286	2.5% 102	0.0% 0	4,201 4200.63
BID ITEM TOTAL	1.00 EA	3,466	347	0	286	102	0	4,201	4200.63
TOTAL BASE BID		3,466	347	0	286	102	0	4,201	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		3,466	347	0	286	102	0	4,201	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-281

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,201		4,201	4200.60
	TOTAL CURRENT CONTRACT COST		4,201	0	4,201	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		4,201	0	4,201	
	Government-Furnished Property		0		0	
	SUBTOTAL		4,201	0	4,201	
	Contingencies	10.0%	420	0	420	
	SUBTOTAL		4,621	0	4,621	
	SIOH (S&A)	5.5%	254	0	254	
	CURRENT WORKING ESTIMATE		4,875	0	4,875	
	Estimated Construction Time	365 Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-282



Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	14	447	2	3,017	3,466 100.0%	0	3,466
	TOTAL DIRECT				14	447	2	3,017	3,466 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-283

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

-----			*** OVERHEAD ***			-----			**** PROFIT ****			-----			***** TOTAL CONTRACT *****		
ID	CONTRACTOR	PM	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHER%	AMOUNT	PCT	UNIT	COST			
AA	GENERAL/PRIME		3,466	347	10.0%	0.0	286	7.5%	2.5%	0.0%	4,201	100.0%	4200.64				
				-----			-----										
				347	10.0%		286	7.5%									
			TOTAL OVERHEAD & PROFIT														

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-284

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	14	447	2	2,873	144	3,466
TOTAL DIRECT	14	447	2	2,873	144	3,466

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-285

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

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SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	14	447	2	2,873	144	3,466
TOTAL DIRECT	14	447	2	2,873	144	3,466

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6913E6

3-286

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTH	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS										1	2

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6913

TIME 07:29:39

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	14	448
TOTAL PROJECT MANHOURS								14	448

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6914

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS  
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS  
 50 2 LAMP @ 96 W/FIXT = 4800 WATTS  
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS  
 0 3 LAMP @ 144 W/FIXT = 0 WATTS  
 0 3 LAMP @ 119.4 W/FIXT = 0 WATTS  
 0 4 LAMP @ 192 W/FIXT = 0 WATTS  
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS  
 0 4 LAMP @ 88 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS  
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS  
 50 1 LAMP W/ REFLECTORS 37 W/FIXT = 1850 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

#### 2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS  
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.80

TOTAL REPLACEMENT KW 1.85

BASELINE ENERGY CONSUMPTION 51.09 MBTU

REPLACEMENT ENERGY CONSUMPTION 19.69 MBTU

NET ENERGY SAVINGS 31.40 MBTU/YR

NET DOLLAR SAVINGS \$611.58

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6914

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
3 LAMPS @ 52 WATTS =	156 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 156

BASELINE ENERGY CONSUMPTION 0.69 MBTU

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
3 LAMPS @ 13 WATTS =	39 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 39

REPLACEMENT ENERGY CONSUMPTION 0.17 MBTU

NET ENERGY SAVINGS 0.51 MBTU/YR

NET DOLLAR SAVINGS \$3.22



Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 07:36:45

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6914

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6  
3-291

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6914  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 07:36:45

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	*** UNIT COSTS: ***		1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	3.00 EA EELEA		4		124	0	83	4	211
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***		0.54		17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	50.00 EA EELEB		27		892	3	6,100	305	7,301
TOTAL DIVISION 16 ELECTRICAL				31		1,016	3	6,183	309	7,512
TOTAL FACILITY AA. ELECTRICAL				31		1,016	3	6,183	309	7,512
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				31		1,016	3	6,183	309	7,512
TOTAL BASE BID				31		1,016	3	6,183	309	7,512
TOTAL ADDITIVE				0		0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				31		1,016	3	6,183	309	7,512

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-293

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR	FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	7,512	10.0% 751	0.0% 0	7.5% 620	2.5% 222	0.0% 0	9,105	9105.03
BID ITEM TOTAL		1.00 EA	7,512	751	0	620	222	0	9,105	9105.03
TOTAL BASE BID			7,512	751	0	620	222	0	9,105	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			7,512	751	0	620	222	0	9,105	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6  
3-295

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	9,105		9,105	9105.00
	TOTAL CURRENT CONTRACT COST		9,105	0	9,105	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		9,105	0	9,105	
	Government-Furnished Property		0		0	
	SUBTOTAL		9,105	0	9,105	
	Contingencies	10.0%	911	0	911	
	SUBTOTAL		10,016	0	10,016	
	SIOH (S&A)	5.5%	551	0	551	
	CURRENT WORKING ESTIMATE		10,566	0	10,566	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-296

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	31	1,016	3	6,493	7,512	100.0%	0	7,512
	TOTAL DIRECT				31	1,016	3	6,493	7,512	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-297

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

			*** OVERHEAD ***			**** PROFIT ****				***** TOTAL CONTRACT *****			
ID	CONTRACTOR	PM	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHER%	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		7,512	751	10.0%	0.0	620	7.5%	2.5%	0.0%	9,105	100.0%	9105.02
				-----			-----						
				751	10.0%		620	7.5%					
			TOTAL OVERHEAD & PROFIT										

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-298



Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	31	1,016	3	6,183	309	7,512
TOTAL DIRECT	31	1,016	3	6,183	309	7,512

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-299

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	31	1,016	3	6,183	309	7,512
TOTAL DIRECT	31	1,016	3	6,183	309	7,512

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6

3-300

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNRSH	ADJ FACTOR	ADJUSTD	BOOK OP	-- HRLY	--- UPB	**** TOTAL ****	COST
ENI20 SMALL TOOLS								1.40	1.40	3	3
TOTAL PROJECT EQUIPMENT HOURS										3	3

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6914

TIME 07:36:45

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	31	1,016
TOTAL PROJECT MANHOURS								31	1,016

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6914E6  
3-302

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6915

BUILDING USE:

HOURS/DAY 10.5  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
26.2 LAMP @ 96 W/FIXT = 2496 WATTS  
0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0.3 LAMP @ 144 W/FIXT = 0 WATTS  
0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
0.4 LAMP @ 192 W/FIXT = 0 WATTS  
0.4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
26.1 LAMP W/ REFLECTORS 962 WATTS  
0.2 LAMP W/ REFLECTORS 0 WATTS  
0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
0.4 LAMP @ 88 W/FIXT = 0 WATTS  
0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
0.2 LAMP @ 168 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 2.50

TOTAL REPLACEMENT KW 0.96

BASELINE ENERGY CONSUMPTION 23.24 MBTU

REPLACEMENT ENERGY CONSUMPTION 8.96 MBTU

NET ENERGY SAVINGS 14.29 MBTU/YR

NET DOLLAR SAVINGS \$305.38

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

## BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6915

LAMP USE:

HOURS/DAY 10.5

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

### EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
0 LAMPS @ 52 WATTS =	0 WATTS
9 LAMPS @ 60 WATTS =	540 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
<b>TOTAL EXISTING WATTS</b>	<b>540</b>

### COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
9 LAMPS @ 13 WATTS =	117 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
<b>TOTAL REPLACEMENT WATTS</b>	<b>117</b>

BASELINE ENERGY CONSUMPTION 5.03 MBTU

REPLACEMENT ENERGY CONSUMPTION 1.09 MBTU

NET ENERGY SAVINGS 3.94 MBTU/YR

NET DOLLAR SAVINGS \$84.21

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 07:47:02

TITLE PAGE

---

ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6915

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93  
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6  
3-305

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

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DETAILED ESTIMATE DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6915  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 07:47:02

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)									
CD=3 EL 6105 SURF SQ W/1 13W BIAxIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	27.80	1.39	70.45
WC=1100 WHITE ACRYLIC LENS 9.00 EA EELEA	11				371	0	250	13	634
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7002 4 FT 1 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.54				17.84	0.07	122.00	6.10	146.01
WC=1100 REFLECTOR 26.00 EA EELEB	14				464	2	3,172	159	3,796
TOTAL DIVISION 16 ELECTRICAL	25				835	2	3,422	171	4,430
TOTAL FACILITY AA. ELECTRICAL	25				835	2	3,422	171	4,430
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	25				835	2	3,422	171	4,430
TOTAL BASE BID	25				835	2	3,422	171	4,430
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	25				835	2	3,422	171	4,430

\* \* \* END OF DETAIL REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-307

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6915

TIME 07:47:02

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,430	10.0% 443	0.0% 0	7.5% 366	2.5% 131	0.0% 0	5,370 5369.93
BID ITEM TOTAL		1.00 EA	4,430	443	0	366	131	0	5,370 5369.93
TOTAL BASE BID			4,430	443	0	366	131	0	5,370
TOTAL ADDITIVE			0	0	0	0	0	0	0
TOTAL INCL ADD			4,430	443	0	366	131	0	5,370

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-309

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	5,370		5,370	5369.90
	TOTAL CURRENT CONTRACT COST			5,370	0	5,370	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			5,370	0	5,370	
	Government-Furnished Property			0		0	
	SUBTOTAL			5,370	0	5,370	
	Contingencies	10.0%		537	0	537	
	SUBTOTAL			5,907	0	5,907	
	SIOH (S&A)	5.5%		325	0	325	
	CURRENT WORKING ESTIMATE			6,232	0	6,232	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-310

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	25	835	2	3,593	4,430 100.0%	0	4,430
	TOTAL DIRECT				25	835	2	3,593	4,430 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-311

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,430	443	10.0%	0.0	366	7.5%	2.5%	0.0%	5,370	100.0%	5369.93
	TOTAL OVERHEAD & PROFIT			443	10.0%		366	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-312

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	25	835	2	3,422	171	4,430
TOTAL DIRECT	25	835	2	3,422	171	4,430

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-313

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	25	835	2	3,422	171	4,430
TOTAL DIRECT	25	835	2	3,422	171	4,430

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6915E6

3-314



Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR		ADJUSTD		BOOK OP --		HRLY	---	UPB	****	TOTAL	****
EQUIP	DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20	SMALL TOOLS									1.40	1.40	1	2
												-----	-----
TOTAL PROJECT EQUIPMENT HOURS												1	2

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6915

TIME 07:47:02

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	25	835
TOTAL PROJECT MANHOURS								25	835

\* \* \* END OF SUMMARY REPORT \* \* \*

# FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

## BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6916

BUILDING USE:

HOURS/DAY 10  
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH  
DEMAND CHARGE \$11.78 PER KW

### EXISTING FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS  
0.1 LAMP @ 37.8 W/FIXT = 0 WATTS  
0.2 LAMP @ 96 W/FIXT = 0 WATTS  
0.2 LAMP @ 75.6 W/FIXT = 0 WATTS  
0.3 LAMP @ 144 W/FIXT = 0 WATTS  
0.3 LAMP @ 113.4 W/FIXT = 0 WATTS  
24.4 LAMP @ 192 W/FIXT = 4608 WATTS  
0.4 LAMP @ 151.2 W/FIXT = 0 WATTS

#### 2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS  
0.4 LAMP @ 88 W/FIXT = 0 WATTS  
0.2 LAMP U @ 96 W/FIXT = 0 WATTS  
0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

#### 8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS  
0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.61

BASELINE ENERGY CONSUMPTION 40.87 MBTU

NET ENERGY SAVINGS 28.53 MBTU/YR

### REPLACEMENT FIXTURE DATA

#### 4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS  
0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS  
24.2 LAMP W/ REFLECTORS 58 W/FIXT = 1992 WATTS

#### 2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS  
0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS  
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

#### 8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.99

REPLACEMENT ENERGY CONSUMPTION 12.35 MBTU

NET DOLLAR SAVINGS \$631.38

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 07:55:02

TITLE PAGE

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ENERGY SAVINGS OPPORTUNITY SURVY  
FT CAMPBELL, KY  
ECO-6: BUILDING 6916

Contract No: 27-93-C-0096

Prepared By: Systems Corp  
Estimator: Keith A. Derrington  
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-318

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6916  
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 07:55:02

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59			19.42	0.08	136.00	6.80	162.29	
WC=1100 REFLECTOR 24.00 EA EELEB	14			466	2	3,264	163	3,895	
TOTAL DIVISION 16 ELECTRICAL	14			466	2	3,264	163	3,895	
TOTAL FACILITY AA. ELECTRICAL	14			466	2	3,264	163	3,895	
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	14			466	2	3,264	163	3,895	
TOTAL BASE BID	14			466	2	3,264	163	3,895	
TOTAL ADDITIVE	0			0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	14			466	2	3,264	163	3,895	

\*\*\* END OF DETAIL REPORT \*\*\*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-320

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

PROJECT NOTES

SUMMARY PAGE 1

---

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN  
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-321

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
 ECO-6: BUILDING 6916

TIME 07:55:02

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,895	10.0% 390	0.0% 0	7.5% 321	2.5% 115	0.0% 0	4,721	4721.03
BID ITEM TOTAL		1.00 EA	3,895	390	0	321	115	0	4,721	4721.03
TOTAL BASE BID			3,895	390	0	321	115	0	4,721	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,895	390	0	321	115	0	4,721	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-322



Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,721		4,721	4721.00
	TOTAL CURRENT CONTRACT COST			4,721	0	4,721	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			4,721	0	4,721	
	Government-Furnished Property			0		0	
	SUBTOTAL			4,721	0	4,721	
	Contingencies	10.0%		472	0	472	
	SUBTOTAL			5,193	0	5,193	
	SIOH (S&A)	5.5%		286	0	286	
	CURRENT WORKING ESTIMATE			5,479	0	5,479	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-323

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	14	466	2	3,427	3,895	100.0%	0	3,895
	TOTAL DIRECT				14	466	2	3,427	3,895	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-324

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,895	390	10.0%	0.0	321	7.5%	2.5%	0.0%	4,721	100.0%	4721.04
	TOTAL OVERHEAD & PROFIT			390	10.0%		321	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-325

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	14	466	2	3,264	163	3,895
TOTAL DIRECT	14	466	2	3,264	163	3,895

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	14	466	2	3,264	163	3,895
TOTAL DIRECT	14	466	2	3,264	163	3,895

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6

3-327

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE *** ADJ FACTOR ADJUSTD BOOK OP -- HRLY --- UPB **** TOTAL ****												
EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
-----												
EMI20 SMALL TOOLS									1.40	1.40	1	2
											-----	-----
TOTAL PROJECT EQUIPMENT HOURS											1	2

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES  
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY  
ECO-6: BUILDING 6916

TIME 07:55:02

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	14	466
TOTAL PROJECT MANHOURS								14	466

\* \* \* END OF SUMMARY REPORT \* \* \*

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6916E6  
3-329